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THESIS

Marketing Problems in the Rubber Production Industry

by

Walter Kechejian
(B.S. in B.A. Boston University 1934)

submitted in partial fulfillment of
the requirements for the degree of

Master of Business Administration

1935

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Introduction

Rubber is the foremost plantation crop of the tropical rain forest, and excepting sugar, the most valuable plantation crop in the world. Fifty years ago it had no importance in either commerce or industry; today it is a major world commodity. Rubber has become so indispensable to our modern industrial life that the question of its control has been at times an international irritant. The United States, as the greatest consumer in the world, is the most vitally interested in securing adequate and reliable supplies at reasonable cost.

While governmental interference with the supply of raw materials is not new, the numerous attempts made within recent years to establish governmental control of raw materials have constituted this one of the outstanding economic problems today. I have attempted to give a concise account of one of these controls, the Stevenson Plan for restricting the output of rubber from the British possessions in the middle east.

The procedure followed was to give a brief history

of rubber and conditions leading to control. I have set forth the economic aspects of the industry, stated the plan, assessed the effects of the restriction on the producer, the consumer and the investor, and given probable reasons for its failure. In the conclusion is set forth some reasons for the lack of success in controlling prices of staple commodities in general and criticizms of the Stevenson Plan. Finally, since previous bitter experiences will not deter the adoption of other control plans, I have given in its embryonic state the latest proposed rubber control scheme and its probable outcome.

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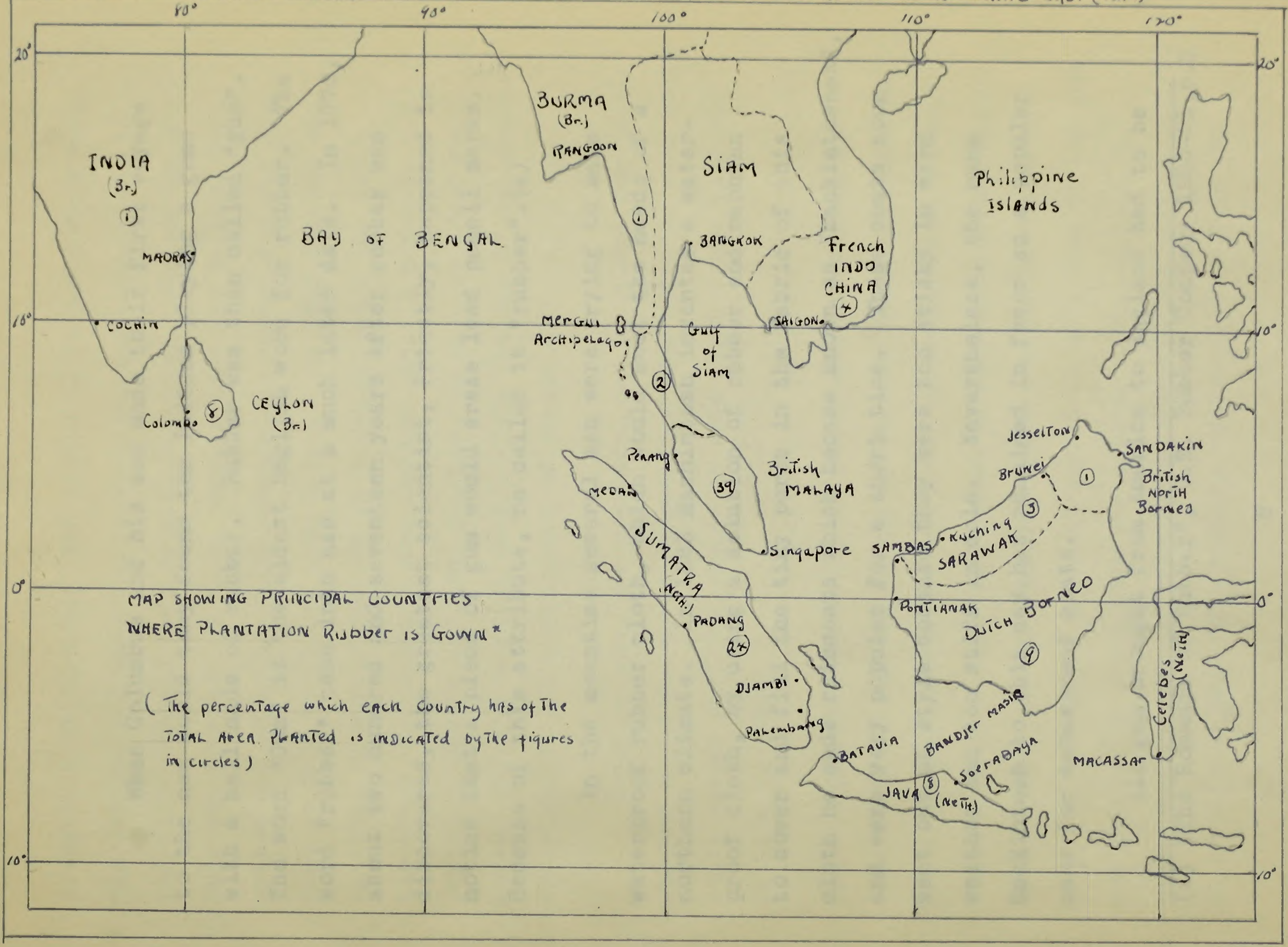
PART ONE

Brief History and Background

* from Rubber Manufactures Association Inc., "Estate and Native Plantation Rubber in The Middle East" (Front.)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CEYLON (Br.)
BAY OF BENGAL
BURMA (Br.)
RANGOON
①
Mergui Archipelago
②
Gulf of Siam
SIAM
BANGKOK
French INDO CHINA
④
SAIGON
Philippine Islands
Penang
MEDAN
British MALAYA
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Singapore
SUMATRA (Neth.)
PADANG
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DJAMBI
Palembang
BATAVIA
JAVA
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(Neth.)
Soerabaya
Bandjer Masin
MACASSAR
Celebes (Neth.)
SAMBAS
Kuching
SARAWAK
③
Brunei
Jesselton
①
SANDAKIN
British North Borneo
PONTIANAK
Dutch Borneo
⑨

MAP SHOWING PRINCIPAL COUNTRIES WHERE PLANTATION RUBBER IS GOWN*

(The percentage which each country has of the total area planted is indicated by the figures in circles)

When Columbus and his men made their first voyage to the new world they found the Indians playing a game with a ball made of rubber. Rubber was then called "gum". The word "Gum" is the oldest English word for rubber. The word "rubber" came into use at a much later date. In 1770, about two hundred and seventeen years after rubber was discovered, the greatest scientist, Priestly, happened to notice that a piece of gum would erase lead pencil marks. Because of this attribute, he called it "rubber".(a)

In the meantime several men were trying to make waterproof rubber cloth, which would meet the needs of a northern climate. In 1823 Machintosh invented a waterproof cloth, by using a solution of rubber and naphtha to cover and fill the tiny pores in the fabric of this cloth he made raincoats which became known as "Mackintoshes", and were very popular for a short time. These coats soon went out of style because they were too sticky in warm weather and too stiff in cold. Nevertheless, the name Mackintosh to this day has remained in favor as a popular name for waterproof coats.

All gum brought from America to England had to be

(a) "The Romance of Rubber", U.S. Rubber Company 1920-21,p.5

brought in solid form. The liquid as it comes from trees curdles and hardens, and in order to make use of it, it had to be changed back into liquid form. One way to do this was by means of heat, which melted the rubber. This method was unsatisfactory because the rubber did not become as hard as it had been before. In 1836 Hancock and Chaffee, an Englishman and an American, made the great discovery that rubber, when kneaded under a moderate temperature, became soft and pliable, so that it could be worked into any desired shape. This was one of the greatest steps in the development of rubber.

Nevertheless, the practical use of rubber for clothing and shoes was still impossible. The articles made would still become soft and sticky in warm weather and hard and brittle in cold.

Charles Goodyear spent many years trying to find some means of working rubber so that it would act the same all year round and under all kinds of weather conditions. While experimenting with a piece of gum which he had mixed with sulphur, he accidently dropped a piece on the hot lid of a stove. Before he could snatch it off, some of the gum had melted and fused with the sulphur. When cooled it turned into something that seemed tougher and less sticky. He soon found that by combining sulphur with rubber and

treating with heat he could produce rubber which would be the same under all weather conditions. This process was called "vulcanization" or "curing".

This discovery made it possible to use rubber in a commercial way and the development of the industry now became rapid. Goodyear made one more discovery which is next in importance to his first. He invented hard rubber or ebonite which invention was the real beginning of the hard rubber industry.

Although great improvements in the manufacturing processes of rubber have been made during the last century, there have been until recently few improvements in the method of harvesting. Until forty years ago, substantially the same methods used by the Indians before the discovery of America were still in use. The trees from which rubber was obtained grew wild in the region of the Amazon, in northern South America, and in southern Central America. There was a great variety of trees and vines from which the rubber fluid could be drawn, the most important and best source was the "Hevea Braziliensis". (b)

Rubber-bearing latex, unlike maple syrup, is found only on the outside of the tree, directly under the bark. The sap of the rubber-bearing tree is distinct from the

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(b)"The Romance of Rubber", U.S. Rubber Company, pp. 12-14

latex and great care must be taken in cutting the tree not to cut too deeply; for if the sap of the tree becomes mixed with the latex it has a harmful effect upon the resulting rubber.

Each native in gathering this latex, has his own route, and after he has cut through the bark of his trees and attached small cups at the base of the cuts, he makes the round of his trees and empties the cups into a large pail which he carries. When he has filled his pail he brings it to his hut or to the collecting stations to be treated.

The rubber-giving latex cannot be allowed to stand for any length of time for it spoils quickly. The native builds a fire in a crude furnace fitted with a sharp cone-shaped pipe which causes the smoke to rise in a small column. The fuel consists of palm-nuts and sticks, and these give forth a heavy black smoke through the hole in the top of the furnace. The natives then take their paddles, dip them into the pails of latex, and move them about in the smoke. The rubber is coagulated almost instantly and the liquid is dried off by the heat, leaving a thin coating of pure gum on the paddle. This dipping and smoking is repeated until a large ball or "biscuit" is formed . When this becomes too heavy to hold comfortably, the native sets the

stick with the biscuit on it in several forked sticks that he has driven into the ground and continues to turn the biscuit in the smoke; but instead of dipping the biscuit into the latex, the latex is slowly poured over the top of the biscuit. This is continued until the biscuit weighs forty or fifty pounds. It usually takes several days to build up a biscuit this size.

Other methods of collecting and coagulating rubber are inferior and therefore produce a less desirable product.

The British Government took the first steps to attempt the cultivation of rubber in a systematic manner. It commissioned H.A. Wickham to go to Brazil and obtain some seeds of the Hevea trees. Wickham's commission was made difficult by the fact that the laws of Brazil forbade taking out of the country any seeds of the rubber tree. These laws were passed in order to enable Brazil to maintain its monopoly of the crude rubber market. However, Wickham smuggled a supply of seeds to England, where they were planted in the Royal Botanical Gardens. Although results were disappointing, enough seedlings were obtained to provide a supply for experimental use in India.

These were planted in Ceylon, and in 1881 they showed the first indication of success. Seven years later some of the trees were of sufficient size to permit tapping and

results were favorable. Thus was laid the basis for the tremendous rubber-growing plantations of Ceylon, Java, Sumatra, and the others. In order to make these plantations successful a great deal of study was necessary, not only with regard to methods of planting and cultivation, but also kinds of soil and conditions of climate. A complete scheme of rubber tree culture had to be worked out.

So successful have the rubber plantations been that cultivated rubber now dominates the market. "In 1900 the output of the plantations was only four tons of crude rubber, while the wild forests (of Brazil mainly) produced 54,000 tons; by 1913 the output of the two sources was equal; in 1922 the production of the plantation article had grown to 340,000 tons, while the wild supply had decreased to 23,000 tons. Thus from a few seeds collected from the Amazon valley have grown the vast rubber plantations in the eastern tropics, with over 300 million trees and supplying over 95 percent of the world's needs from three million acres of land (1925)". (c)

The rapidity with which the rubber industry shifted from the tropical forest of the Amazon basin to great planta-

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(c) Smith, J. Russel, "Industrial and Commercial Geography", New Edition, p. 575

tions on the other side of the earth is a marvel of economic geography.

The causes for the rapid expansion of plantation rubber in Southeastern Asia at the expense of wild rubber of the Amazon and Central Africa are an interesting study of the inescapable forces of economic laws. The more important of these causes are: (d)

1. The quality and quantity of wild rubber cannot be depended upon. Due to the lack of control over gatherers and the lack of standardization of methods and grades manufacturers could never be sure of getting the same quality twice in succession from the same source. Today production in such a large industry as tires, for example, demands strict grading, freedom from foreign substance, and dependability of supply.

2. Curing methods of the plantations are more scientific.

3. Labor is scarce and comparatively expensive in the Amazon basin and Central Africa while there is an enormous supply of cheap and dependable labor in thickly populated Southeastern Asia. Whenever suffi-

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(d) Reed, Virgil D., "The Principles of Economic Geography", 1933, pp. 245-46

cient local labor is not available for the plantations an inexhaustible supply of contract labor can be imported from China and India.

4. Lack of Capital in Brazil and Central Africa and the inability to interest foreign capital in rubber in those regions.

5. Scientific methods and labor saving devices used on plantations actually reduce cost of production far below that of gathering wild rubber. Research and close control constantly improve both product and methods.

6. Coffee failed in Southeastern Asia largely because of fungus diseases, causing growers to seek a substitute in rubber while Brazil found specialization in coffee more promising.

7. Transportation facilities and nearness to the ocean steamer give the present plantation regions a great advantage over the Amazon and Congo basins which are far inland.

8. Trees are planted in rows at proper spacing and one laborer can gather the rubber from several times the number of trees he could tend in the forest where the trees are widely scattered.

9. Hygienic conditions and medical care improve the efficiency of labor on the plantations.

10. Wild rubber could not supply adequately the rapidly expanding requirements of the automobile industry.

"The modern plantation, with its rational, systematic, scientific utilization of land, with its laboratories testing the product and devising ways for its improvement, with its experiment stations patiently laboring for the biological improvement of the species, with its scientific management and orderly control over labor - in short, with all the advantages offered by modern capitalistic enterprises - is infinitely superior, as a mechanism for producing staples, to a band of semi-savages ruthlessly exploited by so-called civilized people, themselves exploiting with equal ruthlessness the free gifts of nature. This is a generalization to which exceptions can no doubt be found; but as a matter of principle the superiority of the plantation method is beyond question."(e)

The Malay Peninsula, Sumatra, Ceylon, Java, Southern India, Borneo, Burma, Cochin-China, various smaller islands of the East Indian Archipelago, Brazil, Central America,

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(e) Zimmerman, Erich W., "World Resources and Industries", pp. 283-84

and the Congo basin all produce rubber but practically all of it comes from the Middle East plantations. About 70 percent is produced in British Asiatic possessions.

"The activity of the American automotive industry entirely determines the profits or losses of the rubber growers." (f) No other major commodity is so entirely dependent upon the state of health of a single industry. Under the stimulus of prosperity in the automotive industry rubber prices went to $2.90 a pound in 1910. In 1932 prices fell to 2.66 cents per pound. Several times booms in American automobile manufacturing have threatened acute shortages in rubber supply. The rapid growth of the industry, particularly since 1905, was dependent upon a rapid expansion of rubber plantations in the Far East. "Although there have been some maladjustments of supply and demand with large temporary surpluses in periods of depression many authorities still feel there are distinct possibilities of a rubber shortage under normal world conditions." (g)

The United States takes from 60 percent to 65 percent of the total production of rubber. Of this about three fourths goes into tire and tube production. The

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(f) Reed, Virgil D., "The Principles of Economic Geography" p. 247
(g) ibid.

next largest importer, the United Kingdom, imports only about 10 percent of the total output.

The great importers are shown in the table below. (h)

Table I
Net Imports of Rubber
(long tons of 2240 pounds)

	1921-25	1931	rank
United States	296,453	501,788	1
France	26,056	46,066	3
Germany	24,929	39,688	5
Japan	20,264	43,483	4
Canada	12,918	25,261	7
United Kingdom	11,978	85,170	2
Italy	9,762	10,149	9
U.S.S.R.	3,016	30,671	6
Belgium	1,932	11,009	8

If the future demand for rubber continues to increase there are still enormous areas capable of expansion and available in the present plantation regions. The Amazon and Congo basins, however, have only a small labor supply . The same is true in Central America, so that expansion in these regions is limited. Improvements of the trees and methods still offer enormous possibilities, particularly the "budding" or grafting of high production stock

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(h) Reed, Virgil D., "The Principles of Economic Geography" p. 248

onto the trunks of young trees of poorer strains. Within the past few years the acre yield of plantation rubber has been raised about threefold. (i)

A Review of Prices (j)

Throughout the history of the plantation rubber industry price has borne little relationship to cost. Prior to 1920 price was high relative to the cost of production because such a price was necessary to ensure the production of the marginal increments of wild rubber. This period was followed by the depression of 1920-22 when prices fell below what was at that time regarded as the long-run competitive level. Then restriction of supply was put into operation and price was maintained artificially presumably above a long time competitive level.

The prices prevailing before 1920 gave a decided stimulus to the production of plantation rubber but as the period between the planting and the tapping of the rubber trees is about seven years it was some time before this influence was felt. World conditions combined to make the reaction to this increased planting particularly severe when it did come, and it was this reaction that led to

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(i) Reed, Virgil, D., "The Principles of Economic Geography" p. 249

(j) Whittlesey, Charles R., "Governmental Control of Crude Rubber", pp. 6-8

the legal enforcement of restriction.

Following restriction of exports in 1922 prices improved and while moderate, were remunerative during the first two years of restriction. In 1925 a buyers' panic struck the market and prices rose to $1.23 per pound in July, remained high until the spring of 1926, and then fell in April below fifty cents per pound. From then until early in 1928 prices were relatively stable around forty cents. In February 1928 the Prime Minister announced that as a result of the failure of restriction to sustain prices at the desired level the Committee of Civil Inquiry was to investigate conditions in the industry. The market felt that this meant repeal and prices declined sharply from 37 cents to 25 cents per pound. With the official statement of repeal prices dropped to eighteen cents. Although restriction continued to hold certain supplies of rubber off the market the prospect of the early removal of the measure caused its influence on prices to be relatively slight and the price held steady about eighteen cents until several months after the removal of restriction.

PART TWO

Economic Aspects of Rubber Production

A. Demand for Manufactured Rubber Articles Relatively Inelastic

In economic theory it is commonplace that fluctuations in market price tend to equalize production and consumption of any commodity by giving the producers a return covering their costs, including interest and profit, at a price consumers will pay. When maladjustments occur a rise in price increases supply and restricts demand and a fall in price produces the opposite effect. Ordinarily this automatic reaction to price changes is rapid enough so that while producers are eliminated from time to time most of them may safely expect such compensation for their services year in and year out as will ensure their continued existence in the industry.

Peculiarities of supply and demand in the rubber growing industry make it a partial exception to these general principles, insofar as short run effects are concerned and it was this fact that brought about governmental control.

In the first place the demand for manufactured rubber goods is relatively inelastic so that the price may double, as had happened in 1923, without reducing to any extent the amount consumed. The inelasticity arose from the fact that approximately 85 percent of the crude rubber consumed is used in the manufacture of rubber tires and tire sundries for automobiles. The demand for tires comes through the

demand for automobiles and since the price of tires is only a minor part of the price of the automobiles a rise in the price of crude rubber has very little effect in reducing demand. Since there is no satisfactory substitute for crude rubber, except for the limited use of reclaimed rubber, another important check on price rises is removed. Where the demand for automobiles, and consequently the demand for tires, runs ahead of the current crude rubber supply the result is an extreme rise in the price of the latter. Herein lies the explanation of the price movements of 1925. When the price of crude rubber rose from 36 cents per pound to $1.23 in a little over four months.

B. Inelastic Supply

In the second place the supply is inelastic in that it is difficult in any short period of time to increase or decrease materially the quantity available. In the case of a manufactured article the period necessary for increasing very substantially the quantity that can be offered for sale may be a matter of weeks or months. Most of the important agricultural products require a period of a year. Others, such as livestock or fruit, may require a somewhat longer time but there is usually a wide choice of substitutes available and this fact tends to limit price fluctuations. In the case of rubber from five to seven years are ordinarily demand for automobiles and since the price of tires is only a minor part of the price of the automobiles a rise in the price of crude rubber has very little effect in reducing demand. Since there is no satisfactory substitute for crude rubber, except for the limited use of reclaimed rubber, another important check on price rises is removed. Where the demand for automobiles, and consequently the demand for tires, runs ahead of the current crude rubber supply the result is an extreme rise in the price of the latter. Herein lies the explanation of the price movements of 1925. When the price of crude rubber rose from 36 cents per pound to $1.23 in a little over four months.

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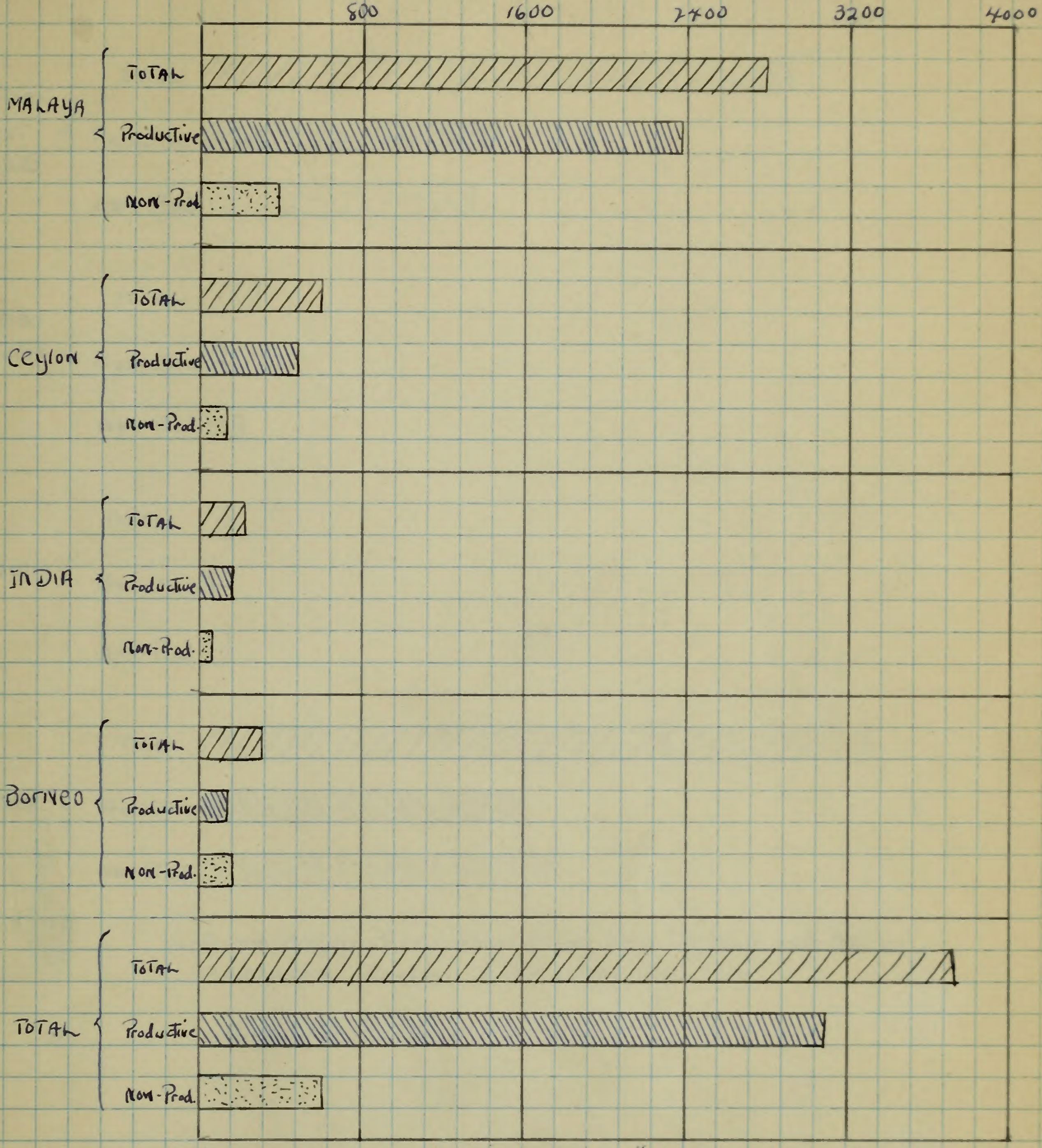
CHART II

ESTIMATED PLANTED AREA in BRITISH MIDDLE EAST (a)

1929

Thousand Acres



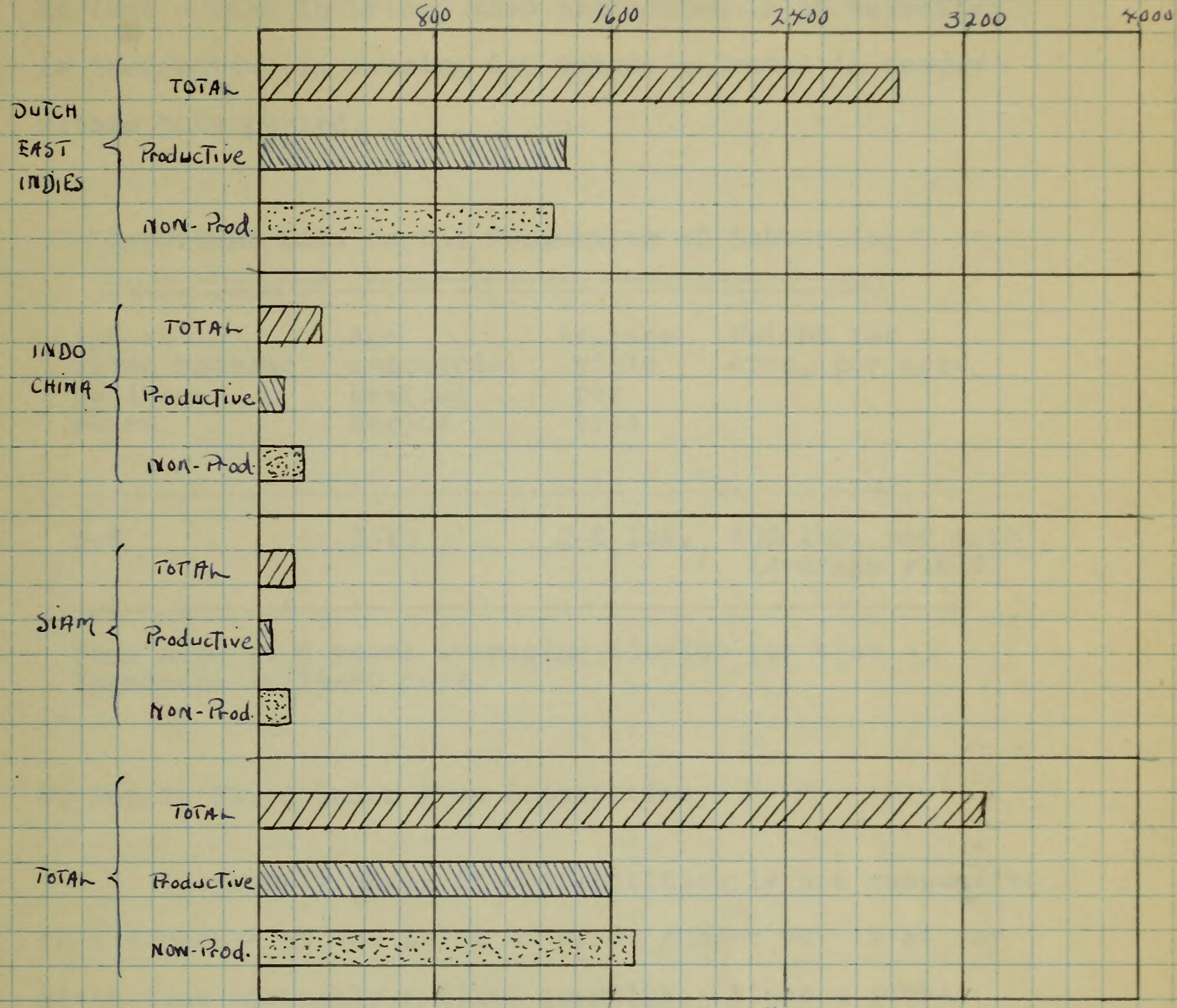
(a) Rubber Manufactures Association Inc., "Estate and Native Plantation Rubber in the Middle East", P. 7

CHART III

ESTIMATED PLANTED AREA in NON-BRITISH MIDDLE EAST(b)

1929

Thousand Acres



(b) Rubber Manufactures Association Inc., "Estate and Native Plantation Rubber in the Middle East," P.7

required to bring a tree to the stage of productivity is that a rise in price, when production is at capacity, is ineffective in causing any marked increase in supply within this period.

Important Data on the Production of Rubber (c)

Age at which bearing begins - years	Age commercial bearing begins	Average yield per tree	Weight per tree, per acre
5-6	8-10	2-5 lbs.	300 lbs. per acre (average yield)

Bear seed at 6 years averaging 500-600 per tree -
Germinate in 10-30 days.

C. Supply Fixed Under Free Competition

The supply under free competition is not responsive to a decrease in the price of crude rubber but is at any given time virtually a fixed quantity. Since a rubber plantation, excepting the small native holding, represents a large fixed investment which cannot be converted into any other use without great loss, and since a crop unharvested is largely an irredeemable loss - the effect of cessation of tapping being slight so far as the life of the tree is concerned - when the amount offered outruns the amount

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(c) McMillan, H.F., "Tropical Gardening and Planting" 1925 third edition

demanded the resulting fall in price fails to check supply and we have a decline in price to the point where variable expenses are barely met. At such a price new uses for rubber as for example, in paving might enable consumption eventually to adjust itself to production, but meanwhile the growers would be seriously threatened with heavy losses.

D. Labor Recruited from Distant Points

The difficulty of suspending production during a period of low prices is intensified by the fact that labor has to be recruited from a distance, in the case of Ceylon and Malaya mainly from Southern India, and in the case of Sumatra from Java. As the coolies are generally under a three year contract the impossibility of disbanding them or replacing them on short notice is apparent. Furthermore, on account of the expense incurred in recruiting, transporting from overseas, medical treatment, and training, the securing of an efficient labor force represents a considerable investment which would be lost if the workers were released even temporarily.

E. The Effect of Small Native Producers

The presence of a large and growing proportion of small native producers further strengthens this inelasticity

of supply and even brings about perverse elasticity at times. As early as 1925 over a third of the area under rubber in the middle east was controlled by Orientals, principally Malayans, Javanese, and Chinese. Their holdings as a rule are small and the rubber has been planted as a side line to the cultivation of rice, though gradually rubber may have displaced the other crop in importance. (d) At any rate, the capital investment is low, equipment is the simplest and overhead is slight since there is none of the management and home office expense which enters into the cost of the rubber produced on estates. Moreover, labor on the smaller holdings involves practically no monetary outlay as the whole family may be employed in tapping. Elsewhere, particularly in the Netherlands East Indies, the work is done on shares, the owner taking half of the rubber produced and the tapper the other half. (e) In either case a falling price may at times actually stimulate production. The tapper or the small owner operator desires to make a certain wage. At the higher price for rubber he produces less and has more time for leisure, while as the price drops he works harder and throws more rubber on the market in order to maintain his accustomed standard of living. (f) There are limits

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(d) Luytjes, A., "Native Rubber Cultivation in the Dutch East Indies" VII Final Report, Charles Grenier & Sons Ltd. 1927, pp. 5-6

(e) ibid. Chapters I,II,III, May 1925, pp. 39-40

(f) ibid.

to this tendency, of course, a point beyond which it is not profitable for either owner or tapper to continue, but this limit is below any price that could be met by the average estate, because of the differences noted above. (g) While the existence, therefore, of a large fixed investment tends to make the supply of estate rubber inelastic, the exact opposite of this situation tends to make the supply of rubber from native holdings also inelastic. The fact that the native may be entirely dependent upon the rubber produced may lead him to increase his output instead of reducing it when price declines.

Where prosperous conditions have permitted the accumulation of a reserve on the part of native growers they may reduce operations for a time in the face of lower prices so giving the appearance of an elastic supply, but are apt to renew operations as their reserves decline even though prices fail to rise. This is indicated by the chart on the following page. With the decline in rubber prices in 1920-21 the production of native rubber was greatly reduced and remained low throughout most of 1921. Toward the end of 1921, and more especially after March 1922, the output of native rubber increased although prices did not rise until

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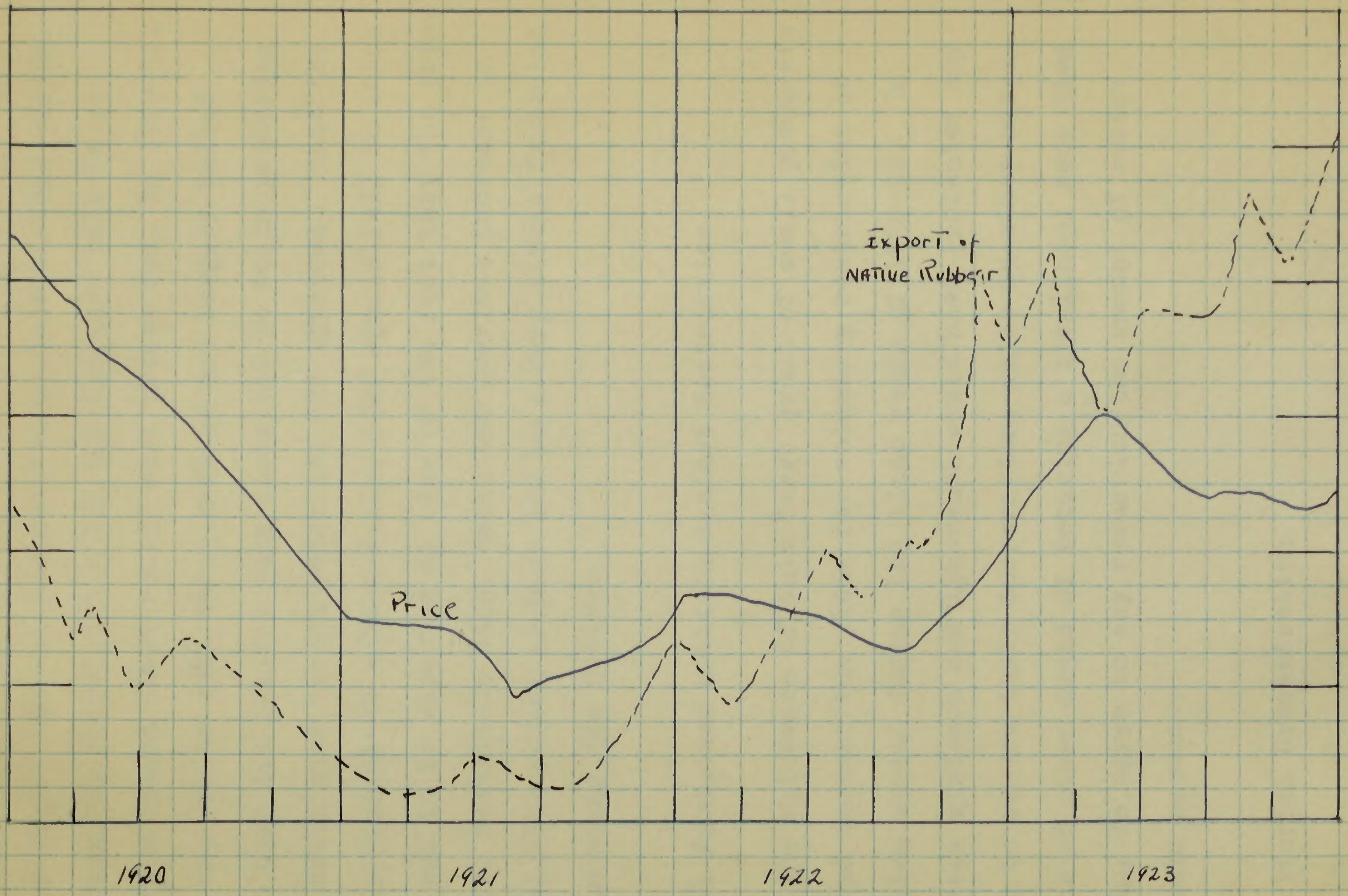
(g) According to a careful survey made by the Dutch Rubber Growers' Association of Batavia the cost price of unsmoked native rubber is around 7 cents per pound. - "Malayan Tin and Rubber Journal", Ipoh, Straits Settlements, September 30, 1922, p. 106

CHART V

Export of Native Rubber, Netherlands East Indies (h)

1920-23



(h) "The Rubber Situation in the Netherlands East Indies," Department of Agriculture, Commerce, and Industry, Buitenzorg, Java, 2nd Edition 1924, p. 5

October 1922. It may, perhaps, be assumed from this that native planters who had accumulated certain savings during the prosperous years just after the War were able to reduce their output considerably when prices fell in 1920-21. Toward the end of 1921 these savings had largely melted away so that the natives were compelled to begin producing rubber again even though price had not improved. That the moderate decline in prices during 1923 should fail to check output was to be expected in view of the fact that the price was still relatively high, while the previous increase in price was too recent to have led to a very strong financial position among the natives.

F. Small Producers Militate Against Restriction

The existence of this large group of small producers militated against the plans for voluntary restriction of production mooted during the slump years of 1920-22. In many cases distance and ignorance would have prevented any attempt to secure their cooperation, while in other cases the lack of other means of securing a livelihood made them unwilling to agree to any reduction in the amount of rubber they could produce.

G. Territorial Concentration

The marked territorial concentration in the production

of the great bulk of the world's supply is a further characteristic of the rubber supply. In 1922, the year in which governmental control of the export of rubber was instituted, 7 percent of the world's supply was wild rubber principally obtained in Brazil. The remaining 93 percent came from the plantations of the middle east, and of this 93 percent over seven tenths was produced in the British colonies, and protectorates of Ceylon and British Malaya. Nearly all the remainder was produced in the Dutch East Indies: Java, Sumatra, and Borneo. This concentration of supply was of vital importance in the attempt to control the price of rubber.

PART THREE

Reports of the Stevenson Committee

First Report (a)

A. The Committee's terms of reference were:

"To investigate and report on the present rubber situation in British Colonies and Protectorates, and to advise what remedial measures should be taken to improve the existing position."

B. The Committee have had many suggestions and much information before them, including:

Reports of the Duncan Committee submitted to the Government of the Straits Settlements and Federated Malay States on January 26, 1921, and the Report dated October 1, 1921 of the Commissions appointed by His Excellency the Governor of the Straits Settlements and High Commissioner of the Federated Malay States to inquire into and report on:

1. The present state of trade depression brought about mainly by the continued depression in the Rubber Industry; and
2. The extension of credit facilities.

C. The Committee devoted their attention in the first place to ascertaining the present state of the Rubber Industry. In the absence of complete official statistical information,

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(a) Whittlesey, Charles R., "Governmental Control of Crude Rubber", 1931, Appendix B p. 204

the Committee carefully investigated the relevant statistics from official and unofficial sources available, and have concluded that the following figures of Plantation and Wild Rubber may be taken as showing approximately the present position:

Table II

Actual Production of Crude Rubber in 1920-21 - Tons

	Plantation	Wild	Total
1920	335,000	35,000	370,000
1921	260,000	22,000	282,000

The normal unrestricted output of Plantation Rubber during 1922 is estimated at 380,000 tons, while the production of Wild Rubber is estimated at 20,000 tons, or 400,000 tons in all.

Table III

Annual World Absorption 1919-1921 - Tons

1919	330,000
1920	310,000
1921	265,000

In the present state of world trade it is not possible to estimate the consumption of Crude Rubber in 1922 at more than the foregoing average, viz: 300,000 tons, but some authorities place the probable consumption as low as 260,000 tons.

Table IV

Total World Stocks of Crude Rubber - January 1, 1922
(estimated - tons)

In consuming countries	210,000
In producing countries	60,000
Afloat	40,000
	310,000

This estimate of the total amouht of Crude Rubber in existence includes the invisible stocks in the hands of both producers and manufacturers. Necessary stocks of Crude Rubber may be estimated at the equivalent of eight months' consumption which on the foregoing estimate for 1922 would call for 200,000 tons. On this basis the surplus stocks at January 1, 1922 amounted to 110,000 tons.

D. From these figures it appears that, in order to reduce production of Plantation Rubber to the level of probable consumption during 1922, a restriction to at least 75 percent of normal would be required. The Committee was of

the opinion, however, that the depression in the Industry could not be sufficiently rapidly relieved unless a substantial inroad was made into the existing surplus stocks during 1922, and that a more drastic restriction is imperative to ensure this.

E. Of these figures, the Committee cannot fail to advise you to contemplate with grave concern the position of the Industry in British Colonies and Protectorates, unless steps are taken to reduce stocks and, further, to prevent over-production of rubber so long as the potential normal production continues to be substantially in excess of consumption. They are of opinion that consumption is not likely to overtake potential production for some years.

F. The Committee next directed their attention to the manner in which the existing surplus could be reduced and future supplies so regulated with a view to establishing an equilibrium between supply and demand, and stabilizing the Industry on a sound footing. They examined this problem from four points of view:

1. Stimulation of new and extended uses of rubber
2. Voluntary restriction
3. The laissez-faire argument
4. Government action

G. With regard to (1.), there is no doubt that much can be done in the direction of stimulating new and extended uses of rubber, but this cannot in itself, provide an immediate solution to the problem, since much time must necessarily elapse before any new use can become sufficiently operative to bring about materially increased consumption. Further, it should be realized that improved methods of manufacturing rubber products, such as tires, undoubtedly prolong the life of the article and consequently curtail the demand for raw rubber.

H. With regard to (2.), the Rubber Growers' Association, which represents about 37 percent of the plantation rubber-producing interests, secured the adhesion of nearly all their members to a voluntary restriction of output to 75 percent of normal during the period November 1, 1920 to December 31, 1921. During December last, they endeavored to secure the assent of their members to continue voluntary restriction by undertaking not to produce more rubber during the first six months of 1922 than they produced during the corresponding period of 1921, or alternatively, than 75 percent of their output during the corresponding period of 1920. The Council of the Association was able to secure the assent of only 55 percent of the producing interests represented by members of the Association, as compared with

the minimum of 70 percent deemed necessary to make the scheme operative. Notwithstanding this, it is evident that the necessity for continuing to restrict output is appreciated by a large proportion of the members of the Association, who will no doubt, continue this policy on an independent voluntary basis.

I. With regard to (3.), the advocates of the laissez-faire policy desire to see a survival of the fittest. They rely on being themselves among the survivors, and disregard entirely the hardships which must fall on the many tens of thousands of shareholders in this country alone, and the many thousands of European and Asiatic owners and shareholders resident in the countries of production, if the Industry is to drift along unprofitably until the weakest have been eliminated. It must be borne in mind that even though a proportion of existing proprietors are forced to abandon their estates, the rubber trees thereon will remain a potential source of rubber and will be brought into production again by someone as soon as a margin of profit can be secured. The Committee could not, therefore, advise you to leave things in their present unsatisfactory state, unless all efforts to find a positive solution of the problem fail.

J. With regard to (4.), the Committee are fully aware of the

grave objections to Government interference with industry, especially when it takes the form of restricting the output of an important raw material. The objections are obvious to all and need not be set out in detail. It was only with reluctance and with a lively apprehension of the dangers which threaten both the Industry and the countries in which it is so largely carried on that the Committee agreed to consider a measure of compulsory restriction as an alternative to what seemed to be worse evils.

K. Further, the Committee desire to put on record that at the outset of their inquiry, they found and have never departed from, the conviction that it was impossible to deal with the problem as one affecting only the British Colonies and Dependencies in which rubber is produced. They recognized from the first that no scheme of restriction, whether voluntary or compulsory, could usefully be applied in Malaya unless it was simultaneously applied in other countries in which there is production of rubber on a large scale. This conviction formed the basis of the Committee's deliberations, and in particular, they have throughout kept in view the fact that no scheme, however excellent in itself, could properly be recommeded to you for adoption unless it commended itself to the Authorities of the Dutch East Indies, who control the only important source of Plantation Rubber outside British

Colonies and Dependencies.

Table V

Relative Importance of Different Plantation Rubber Producing Countries (approximate)

	Percentage of Total Production
Malaya	57.5
Ceylon	12.5
South India and Burma	2.0
Netherlands East Indies	25.5
Other Countries	2.5
	100.0

L. The Committee had numerous schemes before them involving Government action, but as several had fundamental objections it is not proposed to refer to them all in this Report. Two schemes, however, appeared to offer a practicable solution to the problem, and are briefly described:

Scheme (1) is that suggested by the Duncan Committee in their Report of January 1921, and involves legislation prohibiting both the production and export of any quantity of rubber in excess of a prescribed percentage of that produced or exported during a specified previous period.

Scheme (2) was proposed by the Chairman, and comprises

a graduated scale of export duties, varying with the percentage of standard production (i.e., output during a specified previous period) exported; a low duty being fixed on the amount exported within a permissible percentage and prohibitive duties being fixed if more than the permissible standard production be exported.

The outlines of these two schemes are as follows:

Scheme 1:

(a) Adopts, as the standard production, the actual output of each producer during the twelve months, November 1919 to October 1920 estimated to agrigate 330,000 tons of Plantation Rubber from all producing countries;

(b) Restricts to a percentage of the standard production, leaving a margin of production available to meet forward contracts or cases of special hardship; such percentage being fixed from time to time by notification in the Government Gazette;

(c) Sets out draft enactment and rules to carry the scheme into effect.

Scheme 2

"Standard Production" would be the same as in Scheme 1, plus the scale of duties proposed in the following table:

Table VI

Scale of Duties Proposed Under Scheme 2

Percentage of Standard Production Exported	Subject to Duty per Pound Over All	
Over 100	1 s.	2 d.
91 to 100	1	0
81 to 90	0	10
76 to 80	0	8
71 to 75	0	9
66 to 70	0	4
61 to 65	0	2
60 and under	0	1

Of these rates of duty, 1 penny per pound, irrespective of the price of rubber or quantity exported, would be imposed permanently in lieu of the existing ad valorem duty, but rates in excess of 1 penny would be temporarily imposed, say for three years. When the rubber situation improved so as to justify an increased percentage of standard production being exported, the necessary elasticity would be secured by fixing the minimum rate of 1 penny just below the increased

percentage required; thus if export of 70 percent instead of 60 percent could be absorbed, the duty on export of 70 percent and under would be fixed at 1 penny, duty on 71 percent and over remaining as in the scale.

M. It will be seen that the essential differences between the two schemes are that the first prohibits output over a fixed percentage and secures no revenue to the State, while the second would have the tendency to restrict exports over a fixed percentage, but not directly production, would bring in a revenue to the State from duty, and should not prove difficult to administer.

N. The Committee regarded Scheme 2 as the preferable of the two and easily workable. If adopted, the percentage of standard production to be allowed during the twelve months following the introduction of the scheme should be fixed at 60 percent, which, with the margin to read forward contracts or cases of special hardship by reason of the period selected for the standard, would ensure a substantial diminution of the surplus stock of Crude Rubber. Alterations in the percentage of standard production should be governed by the price of standard quality Smoked Sheet in the London Market, and it was proposed that when the price for such rubber had been maintained at not less than 1 shilling 3

pence per pound London landed terms, during the whole of three consecutive months, the percentage of production which may be exported at the minimum duty should be raised automatically by 5 for the next ensuing quarter. At the end of every quarter a similar adjustment, either upwards or downwards, in the permissible percentage exported at the minimum rate of duty would automatically take place, but the percentage would not fall below 60 percent.

In arriving at this formula the Committee had most prominently in view the desirability of taking no steps which would be liable to prejudice the legitimate development and expansion of the uses of rubber. A policy of restriction can only be a temporary palliative, but, in fixing the price which shall govern the alterations in the percentage of standard production exported at the minimum rate of duty, the Committee arrived at what they believed to be a figure which would ensure a satisfactory margin of profit, notwithstanding the somewhat higher cost of a restricted crop. At the same time, the manufacturers of rubber goods should be able to obtain their supplies of crude rubber at a reasonable price with much less risk of the violent fluctuations which have been such a drawback in the past, and should thus have every encouragement to develop new uses for rubber, many of which have already

been suggested and are only awaiting practical exploitation on a substantial scale.

O. The minimum rate of export duty allowed in the scale is approximately twice the amount now payable in Ceylon and in the Federated Malay States at the price indicated, and the Committee contemplated that increases only because the working of the scheme may involve some additional expense on the part of government in administering it. They are of the opinion that a substantial proportion of any additional revenue obtained under the scheme should be specifically set aside and applied for the direct benefit of the plantation rubber industry in such ways as Scientific Research and the development of new uses for rubber.

P. Having reached a tentative agreement to submit the two schemes, the Committee, being convinced that it was essential that any policy of restriction,if it is to be effective, and not to injure one producing country to the advantage of others, must be applied simultaneously in all the chief producing countries, viz: Malaya, Netherlands East Indies, and Ceylon, considered it advisable that steps should be taken to have their schemes submitted to the proper authorities in those countries.

Q. Until the attitude of the Dutch is definitely known the Committee are unable to carry their inquiry further, as they

can not recommend the adoption of either of the proposed schemes by only one or more British Colony or Protectorate.

In view of the present disparity between probable demand and potential production, and the large surplus stocks which exist, the immediate outlook of the Rubber Industry is a serious one, but the Committee desire to Record their unamimous conviction that stabilization on a sound basis can be secured by friendly cooperation among the principal producing countries. So strongly do the Committee believe this to be the case that they consider the Governments concerned would be well advised actively to encourage such cooperation, and they trust that you may consider it worth while, in the light of this report, to cause further representations to be made to the Dutch Government on the subject, with a view to holding an International Conference in London of the principal interests concerned.

Supplementary Report of the Stevenson Committee (b)

A. Since the Committee's last report was issued, the reply of the Netherlands' Government to the proposals for cooperation with His Majesty's Government in legislature to ameliorate the situation in the industry has been received.

The Netherlands' Government has decided not to take at present any legislative measures to restrict the production of rubber in the Netherlands.

B. The Committee have considered the question of whether in these circumstances a policy of restrictive measures in British Colonies and Protectorates alone could be adopted to the advantage of the British rubber industry, and in this consideration they have been influenced by the following facts:

1. Excessive and increasing production of rubber owing to the failure of the producers to make voluntary restriction effective with the consequent continuation of the depression in the price of rubber.
2. The general demand by the leaders of the rubber industry both in London and in Malaya for restrictive

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(b) Whittlesey, Charles R., "Governmental Control of Crude Rubber", 1931, Appendix B p. 204

measures if necessary by one or more of the British Dependencies independently of the Netherlands' Government attitude.

3. The Committee have had before them the latest available estimates as to the figures of the world's production and absorption of rubber in 1922, together with figures of exsisting stocks.

C. Notwithstanding the fact that the rate of the world's absorption of rubber for the present year shows a substantial increase on the Committee's previous figure of 300, 000 tons, they have decided to base their recommendations on the figure of absorption mentioned in their previous report, in order that they may err on the safe side.

D. The Committee have closely investigated the effects of the introduction in British Colonies and Protectorates of legislation framed to bring about more stable conditions in the industry even without government control over production in other territories.

E. Inquiries have been made as to the possibility of securing voluntary restriction of tapping on British estates situated in such other territories in association with any restrictive measures that might be taken in the territories of the British Empire; the Committee understand that the

Rubber Growers' Association have obtained the assurance of cooperation in this sense from the majority of these estates. This support will proportionately reduce the restriction in British territories necessary to effect a readjustment of supply to demand.

F. In view of these considerations and the predominating interest in the rubber industry held by British producers, the Committee have felt a revision of their previous attitude to be justified, and they accordingly desire to recommend that a scheme of government intervention should be put into operation in Ceylon, the Malay States, and the Straits Settlements as soon as possible.

The scheme which they recommend is practically that of Scheme 2 in their previous report, with certain amendments.

RECOMMENDATIONS

1. The scheme recommended adopts as the standard production the actual output of each producer during the twelve months - November 1, 1919 to October 31, 1920 - amplified in accordance with the suggested Rules.......

2. In lieu of existing Export Duties, a minimum

export duty is to be levied on that percentage of standard production which is allowed to be exported under this scheme at the minimum rate of duty. The Committee recommend that this minimum be fixed at the lowest possible rate not to exceed 1 penny per pound.

If a producer desires to export a quantity greater than that allowed to be exported at the minimum rate of duty, he shall pay an export duty on his total export during that period of twelve months on the scale given in the table below:

Table VII

Export Duties on Total Export Over That Allowed at Minimum Rate

Percentage of Standard Production Exported	Duty per Pound Over All	
100	1 s.	0 d.
Over 95 to 100	0	11
" 90 " 95	0	10
" 85 " 90	0	9
" 80 " 85	0	8
" 75 " 80	0	7
" 70 " 75	0	6
" 65 " 70	0	5
" 60 " 65	0	4

At the initiation of the scheme the percentage exportable at the minimum rate is to be 60.

When the rubber situation improves so as to justify allowing an increased percentage of standard production to be exported at the minimum rate of duty the minimum would be substituted in its appropriate place in the scale.

3. Alterations in the percentage of standard production would be governed by the price of standard quality Smoked Sheet in the London Market, and it is proposed that, when the average price for such rubber during three consecutive months has been maintained at not less than 1 shilling and 3 pence per pound, London landed terms, the percentage of production which may be exported at the minimum duty would be raised automatically by 5 for the next ensuing quarter. In the event of such average price being maintained at not less than 1 shilling and 6 pence per pound, London landed terms, during the whole three consecutive months, the percentage of production which may be exported at the minimum duty would be raised automatically by 10 for the next ensuing quarter.

4. Furthermore, in order that the operation of the

scheme may secure the desired result, even though for reasons at present unforeseen 60 percent of standard production should prove too high, the Committee recommended that if during the second quarter after the initiation of the scheme or in any subsequent period of three consecutive months, the price of rubber as hereinfore defined, has not averaged at least 1 shilling per pound, the percentage of standard production that may be exported at the minimum duty shall be reduced to 55, and if that reduction is not effective in raising the average price over the following quarter to 1 shilling and 3 pence, then it shall be reduced to 50 at the end of the three months, and so on by reductions of 5 percent at the end of each quarter until that average price is secured.

Once the percentage has been lowered it would not be increased except on the basis of a price of 1 shilling and 3 pence as aforementioned. If during any quarter when the percentage of standard production that may be exported at the minimum of duty is for the time being fixed at not under 65 percent and the price during that quarter has not averaged at least 1 shilling and 3 pence per pound, the percentage for the ensuing quarter would be reduced by

5. The application of the scheme in their several territories would rest with the local governments concerned.

6. The Committee recommended that an Advisory Committee be appointed in London for the purposes of coordinating the operation of the scheme in Ceylon, Malaya, and such other territories as may be involved. They suggest that this Committee should consist of official and non-official members whose duty would be to advise the Secretary of State on all matters referred to it in connection with the operation of the policy now recommended, and that it should be charged with the responsibility of advising him as to the alterations in the rate of minimum duty required under the scheme.

7. The Committee recommend that the governments of the territories concerned should set up Committees on which there should be representatives of the industry to deal with cases for special consideration in regard to local application of the scheme, and the Committee annex to this Report rules that would require to be observed by these local Committees in the

administration of the scheme.

8. The Committee cannot conclude this Report without observing that, apart from the financial relief that may be expected to accrue to all rubber producers from the scheme, the discouragement it affords to more drastic tapping cannot but benefit the estates of those managements who are voluntarily or compulsorily associated with the scheme and leave them ultimately in a stronger position than the estates whose trees have been subjected to tapping on an excessive scale.

Table VIII

Statistics of Operation of Restriction Plan

			Production		Consumption
Period	Exportable Percentage (c)	Price ¢-lb. (d)	World (000-tons) (e)	Restricted	World (000-tons) (e)
First Year					
Nov.1,'22-Jan.31,'23	60	28.1	412.7	240.9	439.4
Feb.1,'23-Apr.30,'23	60	34.3			
May 1,'23-Jul.31,'23	65	27.3			
Aug.1,'23-Oct.31,'23	60	28.5			
Second Year					
Nov.1,'23-Jan.31,'24	60	26.6	421.2	209.4	458.2
Feb.1,'24-Apr.30,'24	60	23.7			
May 1,'24-Jul,31,'24	60	19.9			
Aug.1,'24-Oct.31,'24	55	28.4			
Third Year					
Nov.1,'24-Jan.31,'25	50	36.3	516.0	268.0	551.2
Feb.1,'25-Apr.30,'25	55	40.5			
May 1,'25-Jul.31,'25	65	79.5			
Aug.1,'25-Oct.31,'25	75	89.9			
Fourth Year					
Nov.1,'25-Jan.31,'26	85	93.5	614.7	344.0	533.9
Feb.1,'26-Apr.30,'26	100	57.1			
May 1,'26-Jul.31,'26	100	44.2			
Aug.1,'26-Oct.31,'26	100	40.7			
Fifth Year					
Nov.1,'26-Jan.31,'27	80	39.1	605.1	298.0	589.1
Feb.1,'27-Apr.30,'27	70	40.0			
May 1,'27-Jul.31,'27	60	37.6			
Aug.1,'27-Oct.31,'27	60	34.4			
Sixth Year					
Nov.1,'27-Jan.31,'28	60	39.6	649.6	354.7	667.0
Feb.1,'28-Apr.30,'28	60	26.1			
May 1,'28-Jul.31,'28	60	19.1			
Aug.1,'28-Oct.31,'28	60	18.7			

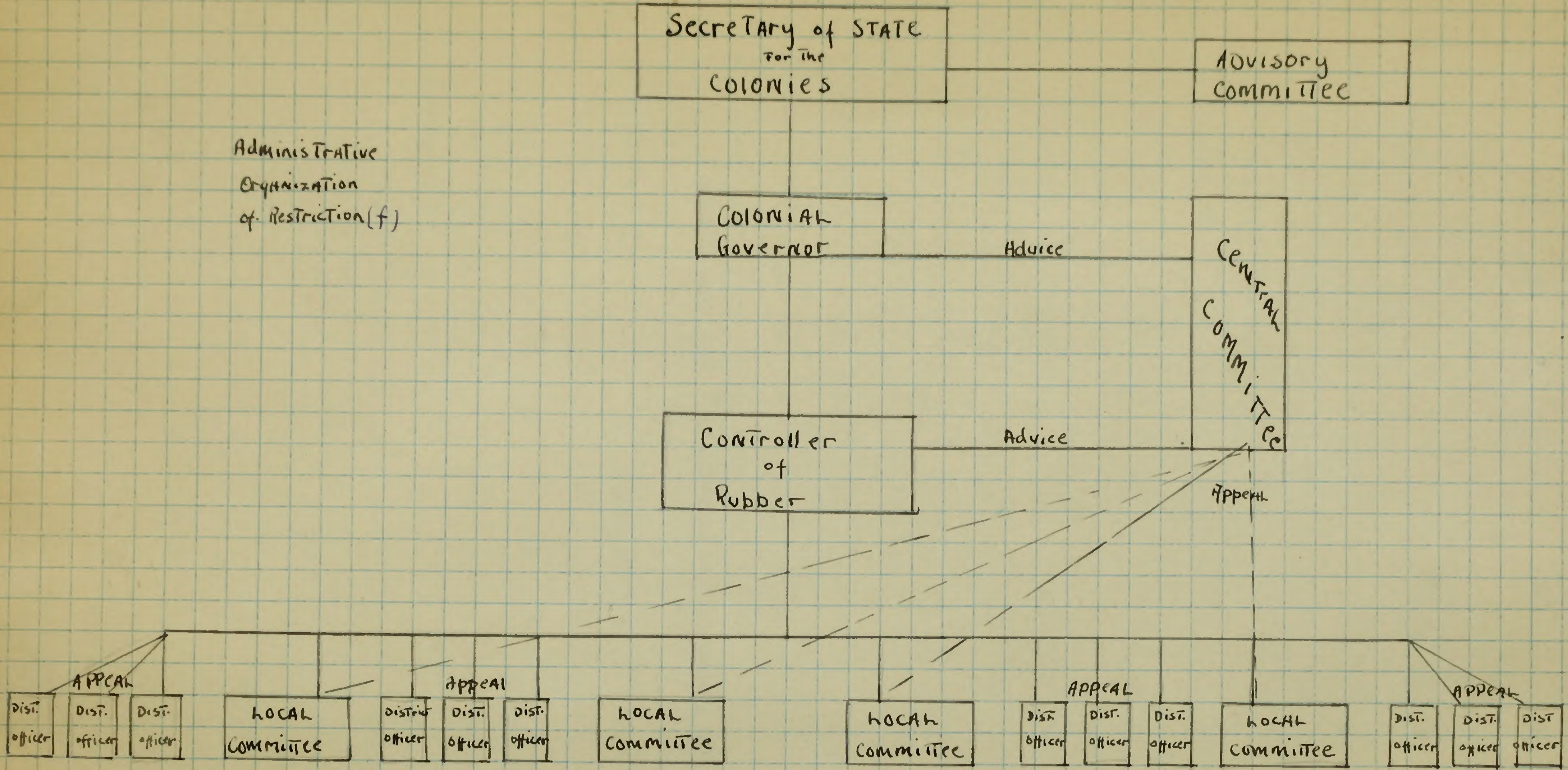
(c) Whittlesey, Charles R., "Governmental Control of Crude Rubber", 1931, p.33

(d) Average spot price in N.Y. for quarter from Standard Statistics Co., Statistical Section, Base Book, 1930-31

(e) Rickinson, W.H., & Son, London, "World's Rubber Position", 1924 - May 1932

CHART VI

Administrative
Organization
of Restriction (f)


Secretary of State for the Colonies
Advisory Committee
Colonial Governor
Advice
Central Committee
Controller of Rubber
Advice
Appeal
Appeal
Dist. officer
Dist. officer
Dist. officer
Local Committee
Appeal
District officer
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Local Committee
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(f) "Governmental Control of Crude Rubber" Charles R. Whittlesey p. 44

PART FOUR

Effect on Producers, Consumers, and Investors

Effect on Producers

Condition of Plantations

When the act was passed in 1922 the plantations were in a run down condition. Many of the planters resorted to overtapping in an effort to reduce unit costs. Others had tapped their trees heavily so as to maintain the same purchasing power despite reduced prices of rubber. Expenditures were lowered to avoid operation at a loss. Although these savings were effective in lowering immediate costs they involved neglect of soil, drainage, weeding, and buildings. Still prices obtained did not cover cost of maintenance. Planters having small holdings allowed their rubber groves to grow up in weeds and jungle because it was more profitable. Abandonments, although not great in extent did occur. The immediate effect of restriction strengthened by an increased demand was a rise in price making it possible for most of the planters to make a profit for the ensuing period and to put the plantations into a better condition. More attention was given to drainage, soil wash, cultivation, weeding, and care and prevention of disease among trees.(a) By limiting the amount of rubber that estates could sell the Stevenson Act compelled the planters in Malaya and Ceylon to give their trees a much needed rest. This helped

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(a) "Yearbook of the Department of Agriculture", Ceylon, 1924, p. 2

to revitalize old trees and safeguarded the strength of young trees just coming into bearing. The less severe tapping methods employed and the resulting conservation of bark were of distinct advantage from the standpoint of the general wellbeing of the plantations.

On small holdings and holdings so situated that they could not hope to produce their assessed standard production there was considerable overtapping by reason of the higher prices offered. (b) The fault in such cases lay in improper assessment of standard production and was inevitable in view of the haste with which restriction was imposed. In other instances owners of good holdings leased additional holdings tapping only the leased holdings while resting his own and thus obtained the full amount of rubber for export allowed on all holdings. Such abuses were not common however. More conservative tapping methods were effected and generally retained even during high prices so that during 1924 there was a marked reduction in the extent of stem and root diseases.

Effect of High Prices, 1925-26

High prices and the larger exportable allowances resulting provided the necessary incentive to bring aban-

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(b) Excessive tapping, as much as twice a day, combined with the use of a ladder to give greater access to tappable bark is most common on small holdings in flat areas near the coast where growing conditions are not so suitable.

doned estates into use. Other holdings, particularly those of the natives in more remote districts were also cleared and better cultivated as a result.

The fertilizing of estates, which stimulate growth and ability to resist disease, the introduction of machinery, a greater bud grafting developed, and a Rubber Research Institute was established as a result of this prosperity in the rubber industry at this time.

There is little evidence that high prices of rubber had affected the character or severity of tapping of native holdings. Although as the quota increased it became necessary to remove more bark in order to obtain greater quantities of rubber, with the exception of a few cases where farming out of holdings on a profit sharing basis led to a draining of the trees, excessive tapping was very rare. (c) The average standard of tapping was far superior than had been in previous years. Improvements in tapping methods made it possible to increase yields without injury to trees.

It had been alleged by the British that Dutch estates badly overtapped their trees following restriction. This was not general and the condition of Dutch estates was declared excellent while costs were greatly reduced.

(c) Excessive tapping occurs when a tree is tapped so frequently or over so large a circumference as to lower its vitality or to prevent bark renewal from keeping pace with bark consumption.

The Removal of Restriction in 1928

With the removal of restriction some laxness in the care of the trees reappeared but this was confined to smaller holdings. Furthermore, the government was better able to cope with such abuses than had been the case in 1922. The net result of restriction from the standpoint of the plantations was a definite improvement in their physical as well as in their financial condition.

Effect on Cost of Production in Restricted Areas

The way in which all-in costs of British rubber companies in restricted and in unrestricted regions were affected by restriction appears from the figures in the following table:

Table IX (d)

All-in Costs of Rubber Companies

Restricted Countries	1922-23	1923-24
140 Malayan Companies	8.68 d	9.68 d
28 Ceylon Companies	7.60	9.20
Unrestricted Countires		
23 D.E.I. Companies	9.22	9.13
20 Plantation Companies	9.07	8.46

(d) "Harvard Business Review", July 1926, p. 858

It is seen from the foregoing figures that following restriction costs of the companies in restricted countries increased 11½ percent and 18½ percent while costs of companies in unrestricted areas decreased by 1 percent and 6 percent. The difference in the movement of costs of companies in Malaya and Ceylon and elsewhere is explained by the fact that, while many of the British estates in unrestricted regions followed restriction voluntarily, most of them did not to the same extent and some did not restrict at all. The primary cause of this tendency toward increased cost of production for the individual plantation lay in the fact that while certain of the costs were reduced with the decreased output others were not, and thus the average unit cost per pound was increased.

A general criticism of the Stevenson Plan is that it tended to reduce the profits of the most efficient estates relatively more than those of the estates having a lower yield per acre. Until the modifications made in 1925 no consideration was given to the ability of some estates to produce more than 400 pounds per acre so that the more efficient plantations were restricted to less than the declared export allowance of their true potential output. Furthermore, plantations, that would have been squeezed

out except for this plan were the least efficient producers. Their elimination would have left the surviving plantations in a stronger position than before the passage of the Act and in a stronger position than they now occupy, because restriction supported the weak along with the strong.

In the case of the Dutch estates in unrestricted areas, by encouraging a high output, overhead costs per unit of product were reduced without giving rise to extravagance.

Effect on Labor

Both of the key industries of British Malaya, tin and rubber, are almost entirely dependent upon immigrant labor. Immigrant labor is also important in Ceylon. Java, however, shows considerable diversification in products and has a very large domestic labor supply, although there is considerable movements of immigrants from China. The situation in Sumatra resembles that of Malaya.

In the Netherlands East Indies the system of Penal Sanction still prevails by which the support of the government is given to the enforcement of labor contracts by making it a criminal offense for the worker to quit the employer who hired him. In Malaya the immigrant enters the country a free agent even though all the expenses of recruiting

and transportating him may have been borne by the planters.

Wages in the middle east followed the tendency in other parts of the world and rose during the war considerably above their pre-war level. The rise was greatest in trading centers such as Singapore and in regions devoted to the production of commodities most affected by war conditions as in Banka where the great staple is tin.

The net result of the period of low prices, 1920-22 was that the reduced demand for labor made it possible to readjust wages on a pre-war basis and that large numbers of coolies were forced out of the country so that when compulsory restriction was enacted labor was not released to any great extent. The rubber growers agreed as early as 1921 that when price improved tapping would not be increased so rapidly as to force wages up again. Similar agreements were made at later times.

In the Dutch East Indies wages were also lowered and additional steps taken to relieve the situation. One was the placing of public lands at the disposal of discharged contract laborers in order to encourage them to remain in the country as colonists. It was also ruled that workers employed under the Penal Sanction could be changed from one plantation to another in order to provide

work for as many as possible.

For seven months following the passage of the Stevenson Act the immigration into British Malaya was much below normal. In part this was due to the introduction of restriction but a more important reason was the uncertainty arising from the passage of the Indian Emmigration Act, the effect of which was so doubtful as to discourage recruiting for a time. Immigration into the middle east is influenced by a variety of factors. Political conditions in China are important and were partially responsible for the decline in immigration during the early months of restriction. In India recruiting is affected by crops, prospects of local employment, and in this instance it was affected by the damage done to Malaya's reputation, in consequence of the slump, as a good wage earning country.

Effect on the Standard of Living of Natives

The increased prosperity that followed the improvement in the rubber situation naturally affected the condition of the mass of the population. This was most noticeable during 1925-26 when rubber prices were at their peak, though in both restricted and unrestricted areas the improvement dates from the beginning of restriction. The

most spectacular evidence of the influence of the prosperity in the rubber industry upon the native's standard of living was in his expenditures for articles consumed. The natives with their newly acquired wealth were reported to be crowding the shops, buying freely for themselves and their families. Natives coming to town with their unaccustomed wealth turned to the purchase of fine clothing, jewelry, notions, trinkets, musical instruments and a great variety of things they had always been forced to do without, except for a brief period during the war, because of their lack of money.

On the whole, the natives were not as spendthrift as was alleged and they seem to have been careful to provide for their more prudent wants before they turned to their more extravagant, with the result that the end of the period of boom prices found them better fed, better clothed, and better housed than they had been before.

The Output of Rubber Under the Stevenson Act

Restricted Areas

It is improbable that the full assessed standard production would have been produced even if restriction had not prevented so large an output. There is no indication to show that prices would have risen as and when they did if

it had not been for restriction, although the ultimate rise might have been as great. A continuance of low prices for some time would, therefore, have been almost inevitable in view of the large stocks on hand, since the actual rise following restriction seems to have been largely due to psychological factors. Under existing low prices abandonment of plantations and reduction of tapping would have made the realization of the so-called standard production impossible.

The figures for 1926 when production was only slightly restricted indicate that throughout the intervening period the amount that could have been produced on existing plantations had been considerably in excess of demand at prevailing prices. It is likely that without restriction prices would have remained low for some time and production would have eventually been checked.

One definite effect of restriction upon production in the restricted countries may be mentioned. As a result of being on a restricted output for a considerable length of time most of the estates found it impossible to expand their production as rapidly as increases in the quarterly allowances in 1925-26 permitted. The principal limiting factor was labor. Certain of the estates had sufficient labor because they had been maintaining forces somewhat in excess of their

requirements but in general the labor supply had been kept below capacity requirements so that they found it impossible to expand production rapidly. In other cases reserve stocks had been accumulated making it possible for them to export their full quotas and so to take advantage of the high prices prevailing. As a result of the general situation there was a piling up of considerable quantities of unused export rights which became a serious problem later when the question of reductions in the exportable percentage again rose. Ceylon, in fact, failed by 12 percent to export the quantity authorized during the year 1926.

With the removal of restriction a flood of rubber was released, exports from British Malaya in November and December 1928 being nearly double the highest monthly rate previously. This was mainly due to the face that many planters, particularly the proprietors of small holdings, had accumulated considerable stocks of rubber in anticipation of the repeal of the Act. Therefore, while the export of rubber was restricted according to the provisions of the law up to the very day of its repeal, it had ceased to control the production of rubber on plantations some time before.

Unrestricted Areas

Production in the Netherlands East Indies expanded greatly following restriction. This has often been assumed to have been entirely the result of restriction, but virtually all of this increased volume of rubber was obtained from trees planted from five to seven years before. As the Netherlands Indies were much less affected by the war than was British Malaya a great deal of planting occurred at that time which was just coming into bearing in the years immediately following restriction. Much of the increased output would, therefore, have occurred without restriction, though it is likely that, in the absence of the restrictive legislation, abandonments and temporary cessation of tapping in consequence of lower prices would have prevented some of this rubber from entering the market. On the other hand, this would have been partially offset by production from British and other planters in unrestricted areas who followed Malaya and Ceylon in restricting.

The outstanding feature of the expansion of production in the Dutch East Indies was the very unexpected growth in the output of native rubber. The increased from 1920 to 1926 inclusive was elevenfold. In 1920 native rubber from the Netherlands Indies was less than 3 percent of the total

world production and in 1926 was 14 percent of the total.

Contrary to predictions, native rubber production seems to have assumed a considerable degree of permanence and to be subject to no very great changes with declines in price.

The production of rubber in the Netherlands Indies was also increased by rubber smuggled out of the restricted countries and unloaded in the unrestricted areas. The volume of such smuggled rubber was large at times. The fact that the export of rubber from Dutch ports increased only slightly during 1926 was in part explained by the reduction of smuggling from Malaya following the raising of the exportable allowance to 100 percent.

The volume of rubber produced in other unrestricted countries in the middle east, French Indo-China, India, and Burma was relatively slight.

The increase in the production of guayule rubber following restriction was marked. This increase came partly from plants growing wild in Mexico and partly from plantings left unharvested because of the low prevailing prices during the slump years.

The production of wild rubber in Africa and in Brazil and other parts of Central and South America was not greatly

affected by the higher prices prevailing under restriction. The supply of wild rubber is not elastic and reacts slowly to changes in price. The economic and political status of the natives in the regions producing wild rubber has changed considerably since the time when wild rubber dominated the market, the days when every ton of rubber was said to represent human life. The more accessible trees have been destroyed so increasing both the cost of securing rubber and the time required for harvesting it.

Quality of Rubber Produced

One of the first effects of restriction was to make buyers less particular as to the precise quality of rubber purchased. With the high prices of 1925 a definite increase in the impurities contained in rubber imported to British Malaya for reconditioning was observed. Adulteration was particularly common among native producers in Dutch Borneo and other parts of the Dutch East Indies in spite of laws forbidding it. As a result of more careful inspection of rubber shipped out and the sentencing of offenders to prison some improvement was brought about, but the quality of native rubber remains distinctly inferior to that of estate rubber.

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Table X

Net Exports of Crude Rubber 1910-1930 (e)
(000 tons)

(As Estimated by the Rubber Growers' Association)

	Wild			Plantation					
Year	South Amer.	Other wild	Total wild	British Malaya	Neth. East Indies	Ceylon	Other	Total Plant -ation	Total wild & Plant-ation
1910	44	39	83	6.5	2.4	1.6	.5	11	94
1915	40	11	51	70.2	20.	20.8	4.6	115.6	166.6
1920	30	7	37	181.	80.	39.0	16.6	316.6	353.6
1925	28	11	39	210.	189.	45.7	34.8	479.5	518.5
1929	21.1	4.9	26	455.5	255.5	80.3	44.2	835.5	861.5
1930	14.3	4.2	18	4442.7	241.	75.6	40.1	799.4	817.8

Planting

The improvement in price served to stimulate new planting in both restricted and unrestricted areas though the increase was somewhat greater and more immediate in the Netherlands East Indies than in restricted countries and among native planters than among estate planters.

The possibility of native rubber replacing estate rubber has come to be regarded as distinctly probable, since even before the war it was increasing faster than

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(e) Row, J.W.F., "Studies in Artificial Control of Raw Material Supplies", No. 2 Rubber, April 1931, p.83.

European rubber. The native producer is free from vexing labor problems; he is not obliged to maintain a large and expensive organization with high overhead; his taxes are less; he has no sick benefits or bonuses to pay; and ordinarily, his expenditures for labor are very slight as his whole family works. A further advantage is the facility with which he can turn from rubber to rice or some other crop and so maintain himself when prices drop. This explains why native planting expanded more rapidly. (f)

In view of these considerations it is expected that European owned and managed rubber estates in the Netherlands East Indies will be a curiosity.

Planting in Restricted Areas

Since the planting that occurred after the passage of the Stevenson Act resulted in a situation of potential overproduction, it is seen that restriction could have been made effective over an extended period of time only by controlling planting as well as actual output. The tendency of high prices is to stimulate planting and eventually to increase the volume of rubber offered for sale, but restriction can only operate to bring about high prices by holding down the amount of rubber supplied to the

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(f) The native planter here referred to is the holder of a few acres only.

market. Therefore, in order for restriction to be effective the extension of planting must be limited.

Planting in Unrestricted Areas

Since growers in the Netherlands Indies were on full production their financial position made planting operations feasible. Thus while the new planting in the Dutch East Indies following restriction was not extremely large it was greater than that undertaken in the restricted countries with the high prices of 1925-26 heavy planting was begun. The lower prices of 1927 failed to check planting materially and with the New York price between 35 cents and 40 cents full planting would continue.

Attitude of the American Consumers

Shortly after the Stevenson Act was proposed the Rubber Association of America, representing 85 percent of the output of rubber goods in this country, appointed a committee to deal with the situation. The attitude of the Americans was that restriction was economically unsound, in principle, that it was unnecessary and that the situation was correcting itself; also, that it lacked flexibility and therefore might interfere with the growth of the industry, promote a speculative market, and place a heavy burden on the industry and on the American people.

The Americans requested first, the repeal of restriction and second, for such flexibility as would prevent undue hardship to the consumers, or finally, for official assurance that in case of a runaway market the discretionary power of the British government would be exercised to ease the situation. Such assurance was never given but it was declared that if the predicted condition of market stringency did come about the government would take necessary steps to meet the situation. American manufacturers in general accepted the view that they had nothing to fear from restriction and, persuaded that restriction was necessary to save the industry, settled down to a period of stable prices.

One outstanding exception to this was Harvey S. Firestone. So violently did he oppose the conciliatory attitude of the Rubber Association of America, of which he had been president, that he withdrew from the organization. He called a meeting of protest against restriction which was attended by a considerable number of smaller manufacturers. Firestone backed his opinion with an active propaganda program in addition to undertaking extensive planting operations of his own.

The attitude of the United States government was one of opposition from the start. It was declared that aside from the commercial aspects of the question the government was vitally interested because of the importance of the commodity in warfare. Because of the localization of the supply in the middle east where it could be subjected to the control of any large power in time of war the government called attention to the desirability of planting in other parts of the world. (g)

The American manufacturers allowed stocks of crude rubber to diminish during 1923 and 1924 until the end of that year found them short. Buyers began to suspect that they had been too optimistic and began to buy in a rising market. At this point, in the spring of 1925, the Rubber

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(g) Whittlesey, Charles, R. "Governmental Control of Crude Rubber", 1931, p. 137 This is not an argument against restriction but against undue localization.

Association of America cabled to the Rubber Growers' Association requesting that they use their influence to the end that the government exercise its power and allow sufficient releases of rubber to check the rise in prices, in accordance with the assurances given two years before. All responsibility was disclaimed by the British and they countered by ascribing the blame for the rubber shortage to the Americans. Partly because of the feeling that they had been "sold out" by the British and partly because of the high prices the manufacturers became definitely hostile toward restriction and joined against it.

An investigation undertaken in 1926 showed that in general the Americans considered themselves the aggrieved party but there were some who felt that the British had as much a right to levy their export duty as we to levy our import duties.

Fluctuations in price during 1927 were less than in any other year and this did much to reassure manufacturers with respect to restriction. They take the attitude that, within reasonable limits, they do not care how high prices are so long as they are stable. (h) The level of prices

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(h) Very high prices are dangerous to the manufacturer even aside from the effect on consumption of the finished product. With the price of crude rubber at $1.00 per pound a 25 percent decline would mean a loss of 25 cents per pound on inventories while at 20 cents per pound a 25 percent decline would mean only a loss of 5 cents per pound.

was not unduly high as compared with former levels so that the consuming public, buying tires for less than ever before, was also inclined to be satisfied. Active opposition to restriction therefore, largely died away at this time.

The attitude which was first one of trustfulness, then of injury and violent opposition, became watchful skepticism. Therefore when restriction was abandoned there was a general feeling of relief.

What Was Done by American Consumers

A campaign for economy conducted by the Department of Commerce was undertaken. Consumers of rubber products were urged to secure greater use from the goods. Tire tests were made and literature was issued telling how to care for tires. The use of repair materials was urged. The tire manufacturers themselves joined in this program although it meant reduced sales.

Too much weight cannot be given to the purely domestic activities of the Department of Commerce. It is of greater significance that the tire replacement per car during 1926 was 1.98, the lowest ever recorded. (i)

(i) Hymans, Kraay, "Rubber Facts, Figures, Forecasts", 1927 London, p. 18 ...."sales of automobile casings for replacement purposes were 4,333,000 lower than for the preceding fiscal year, a decrease of 16.6 percent, and sales of inner tubes were lower by 8,710,000, or 22.6 percent.

The consumption of crude rubber showed a decrease of nearly 7 percent in 1926 as compared with 1925. (j) This is especially noteworthy in view of the fact that the registration of automobiles and trucks was 10 percent higher and gasoline consumption 17 percent higher.

Table XI

Automobile Registration, United States (k)
1920 - 1928

	Passenger Cars	Trucks
1920	8,225,859	1,006,082
1921	9,346,195	1,118,520
1922	10,864,128	1,375,725
1923	13,479,608	1,612,569
1924	15,460,649	2,134,724
1925	17,512,638	2,441,709
1926	19,237,171	2,764,222
1927	20,219,224	2,914,019
1928	21,379,125	3,113,999

The economy program was also directed toward the

These figures are more striking in view of the fact that 2,360,000 more automobiles were running in the past than in the preceding fiscal year, which added number of cars should normally have required about 7,000,000 more tires and 10,000,000 more inner tubes for replacements." - "Commerce Reports", October 25, 1926.

(j) "Commerce Yearbook", 1926, Vol. I p. 458

(k) "Facts and Figures of the Automobile Industry", 1929 edition, National Automobile Chamber of Commerce, New York, p. 5.

retailers. They were encouraged to carry smaller stocks. The result of a survey made showed that on October 1, 1926, dealers averaged 49.8 casings each as compared with 56.6 casings each on October 1, 1925. (l)

Finally, there were efforts to introduce economy among the manufacturers. It was proposed to abolish fabric tires, to eliminate some of the smaller sizes, standardize the styles, and so simplify manufacturing processes as well as reduce to a great extent the volume of stock necessary for dealers to carry. (m)

Another improvement in marketing practice was temporarily effected. Tire manufacturers agreed to abandon the custom of "spring dating" whereby orders were solicited in October for spring requirements, and plants were run at capacity during the winter to fill these orders. By postponing shipments of spring stocks until March 1, and manufacturing meanwhile only enough tires for current requirements the industry was able to postpone its demand for crude rubber and help to relieve the market situation. Dealers were also urged to dispose of surplus stocks before ordering more. This abolition of spring dating was credited with retailers. They were encouraged to carry smaller stocks. The result of a survey made showed that on October 1, 1926, dealers averaged 49.8 casings each as compared with 56.6 casings each on October 1, 1925. (l)

(l) "India Rubber and Tire Review", Akron, Ohio, The India Rubber Review Company, December 1926, p. 30.

(m) These and other measures for reducing stocks were only temporary expedients and would not reduce the long run demand for rubber.

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(l) "India Rubber and Tire Review", Akron, Ohio, The India Rubber Review Company, December 1926, p. 30.
(m) These and other measures for reducing stocks were only temporary expedients and would not reduce the long run demand for rubber.

The Department of Commerce also strongly urged the use of substitutes. The most important was reclaimed rubber, which development virtually created a new industry in this country. (n) The production of reclaimed rubber has been correlated closely with the price of crude so that the low prices of 1920-22 made serious inroads on the industry but the high prices of 1925-26 put the industry back on its feet.

The Stevenson Act thus operated much as a protective tariff would have done. By maintaining an artificially high price the infant industry of reclaiming was developed to such a point that it is now able to stand on its own feet in the face of full competition from crude rubber. It is probable that ordinary demands of the rubber manufacturing industry would have brought about this same development in the course of time without restriction but it is no doubt true that the development was hastened thereby.

Synthetic rubber was produced in considerable quantities by German scientists during the war but the costs were

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(n) Reclaimed rubber is obtained from old tires, old shoes, and other kinds of worn out rubber goods.

prohibitive under normal conditions and in quality it was distinctly inferior.

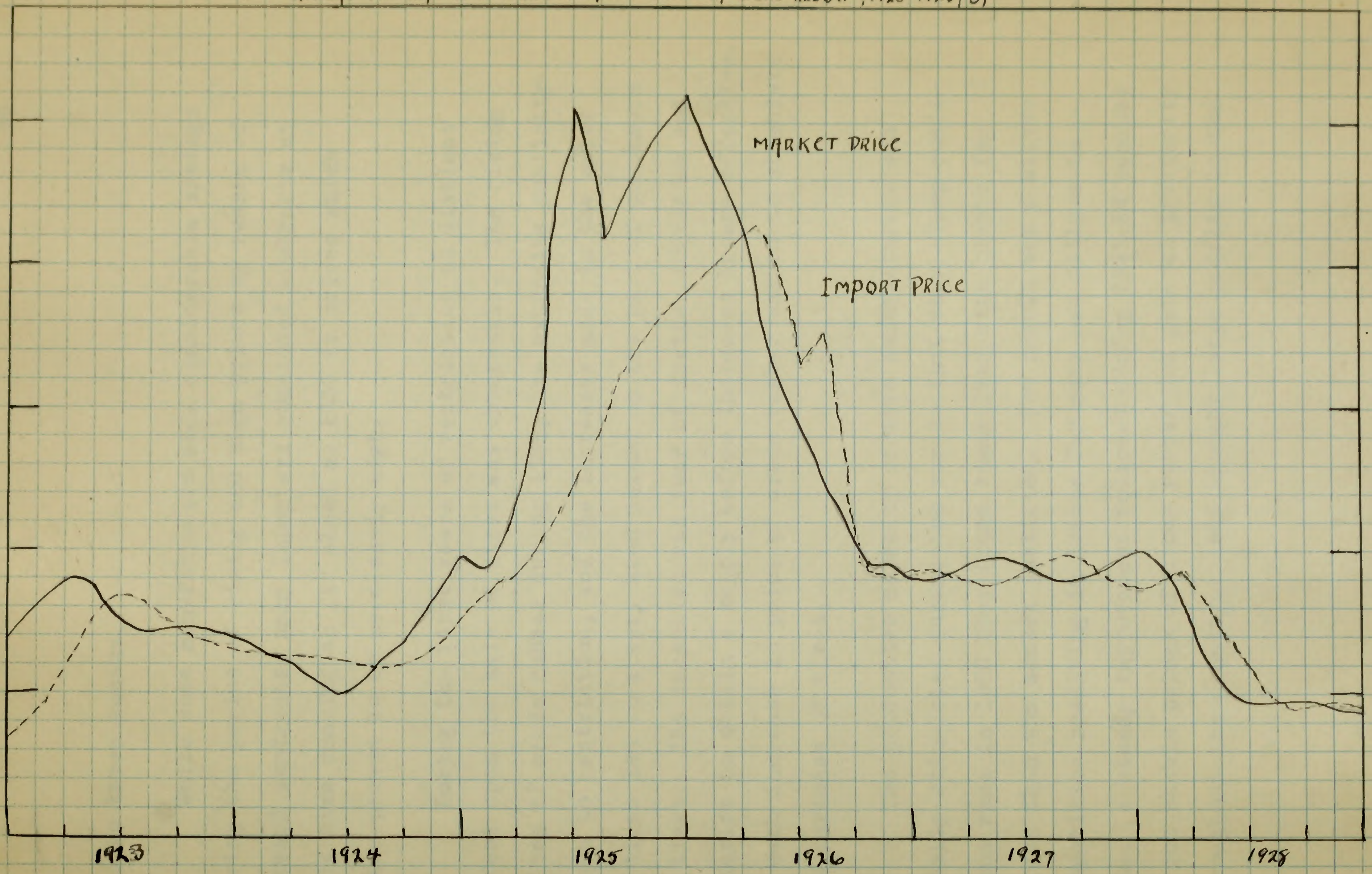
Effect on Manufacturers

Cost to the Manufacturers

Since a consignment of rubber is ordinarily contracted for months before it is received in this country there is always a distinct lag between market price and import value. The practice of making forward contracts for still longer periods increases this tendency even further. Thus in July 1925, when market price averaged $1.031, the average price of imports for the month was only $.463, and the peak of import prices, $.797, was not reached until February of the following year, or a quarter of a year after the month of highest average market price. Similarly, the average market price for 1925 and 1926 was $.725 and $.487 respectively while the average import value was higher in 1926 than in 1925, being $.546 as compared with $.484. This explains why imports 4.2 percent greater than in 1925 cost us 17.7 percent more. The chart on the next page shows that the average price actually paid for rubber imports fluctuates much less than market price and that changes in the market price are reflected in changes in the import price with a lag of from

CHART VII

Average Monthly MARKET AND import Prices of Crude Rubber, 1923-1928 (0)



(0) Charles R. Whittlesey, "Governmental Control of Crude Rubber", 1931. p. 149

two to three months.

While some manufacturers made considerable savings during the period of rising and high prices by reason of forward contracts, many importers concluded contracts at this time running as far ahead as 1930 at prices which later proved to be needlessly high.

During the first years of restriction no distinct effect upon the sale of tires was observable. The rising prices of crude rubber during 1925, the extensive publicity given to restriction, and the increases made in the price of tires led to a very keen demand on the part of consumers of tires. The incentive was fear of further increases and a desire to obtain a supply before increases became effective. So each increase in price of crude rubber served to stimulate the purchase of tires.

The productive capacity of tire manufacturers was greatly stimulated during the war so that when slump conditions came in 1920 they found themselves with plants far larger than the market justified. The result was a bitter competition resulting in losses for many and failure to some. A steady improvement followed during 1923-24 because of the stable prices of crude rubber and general prosperity throughout the country. 1925 brought large profits to the

industry. Therefore instead of high prices of crude rubber proving immediately injurious to the manufacturers they were responsible for one of the best financial years in the history of the industry. The explanation of this lies in the stimulation given to buying and in the great appreciation in the value of inventories.

Both these factors operated in the opposite direction during the following years. Sales were unsatisfactory, even where higher prices brought about a larger total value. Many companies made forward contracts for a longer or shorter period at prices above the prevailing market price so that they were using dear rubber in tires which had to be sold at prices based on current quotations for crude rubber. Inventories which had appreciated during previous years now greatly declined in value. The result was a year of more acute financial distress than the industry had known since the depression of 1920-21. (p) Taking rubber manufacturing as a whole only 55 percent of the establishments made profits for the year. (q) Although the 45 percent which failed to make profits were in general the smaller companies and this 45 percent represented about 7 percent of the total volume of sales, the larger companies with few exceptions also saw their profits greatly reduced.

(p)"India Rubber and Tire Review", Akron, Ohio. May 1927 p. 18

(q) ibid., August 1927, p. 22

Tire Prices

Up to the beginning of 1925 restriction had no apparent effect upon tire prices unless the stability of the price of crude rubber may have contributed to reductions. In any event tire prices at that time were the lowest they had ever been, in addition to which the mileage given by the ordinary tire had been increased three or four times. (r) Late in the spring of 1925 the rising costs of crude rubber made advances in tire prices necessary.

The increase in cost to the final purchaser was considerable since all the agents in the process of distribution calculate on a percentage mark-up based on cost to them. But it was alleged that even when allowance was made for pyramiding the increase in cost to the consumer was entirely out of proportion to the increased cost of crude rubber, so that the manufacturers appeared to be making use of restriction to extort unreasonably high prices for their tires. It was claimed that an increase of $11 in the cost of the crude rubber in a balloon tire resulted in an increase of $28 in the price to the consumer. The president of the United States Rubber Company stated that the increase was entirely due to the increased cost

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(r) "Rubber Age", November 25, 1926, p. 174

of crude rubber but that an increase in tire prices would have been necessary under ordinary conditions because competition had driven prices below a remunerative level.

While charges of profiteering on the part of manufacturers seem largely unfounded the wide publicity given these charges contributed to the weakness of demand on the part of consumers and helps to explain the rapidity with which quotations returned to low levels. (s)

Buyers' Pool

A Buyers' Pool was organized in December 1926 for the purpose of stabilizing price. Amounting to $40,000,000 it was joined by leading tire and automobile manufacturers, including the United States Rubber Company, Goodyear, Goodrich, Fisk, Firestone, Kelly-Springfield, and others; and General Motors, Dodge Brothers, Willys-Overland, Packard, Studebaker, and others. (t)

The General Rubber Company, a subsidiary of the United States Rubber Company, had an organization in the middle east and was appointed to act as buying agent for the pool. The purpose of the pool was to lend stability to the market and to this end it was planned to acquire a reserve between 25,000 and 50,000 tons of rubber which the

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(s) "India Rubber and Tire Review", Akron, Ohio, May 1927 p. 15
(t) ibid., December 1926, p. 15

pool would hold in this country as a precaution against price fluctuations in the future. (u) In addition it was suggested that by timely purchases the pool might check the fall in prices and so reduce the loss to manufacturers on their inventories.

The pool was a definite stabilizing force in the market and it was given considerable credit for the notably steady prices of 1927. By the summer of 1928 the pool was completely liquidated and losses amounting to nearly $20,000,000 were alleged to have been incurred by it.

Foreign Trade

The improved prices following restriction served to increase the cost of our imports. This tendency became very marked in 1925 when an increase of less than 21 percent in volume of imports represented an increased cost of 147 percent and again in 1926 when imports 26 percent greater in volume than in 1924 cost the importers 190 percent more than in 1924. The average import prices of crude rubber are shown on the following page.

As a result, principally, of this great increase in crude rubber, it became our most important import during these years. It increased from 4.8 percent of our total

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(u) "India Rubber and Tire Review", Akron, Ohio, December 1926, p. 30

imports to 10.2 percent in 1925 and 11.4 percent in 1926.(v) Furthermore, it was a considerable factor in the decline in the so-called favorable balance of trade both years.

Table XII

Average Import Price of Crude Rubber (w)

1921	.....	.178
1922	.....	.151
1923	.....	.267
1924	.....	.237
1925	.....	.484
1926	.....	.546
1927	.....	.356
1928	.....	.250

(v) "Commerce Yearbook", 1925, 1926
(w) ibid., 1929 Vol. I, p. 468

Effect on the Investor

A recent estimate found that the total capital invested in plantations is about $90,000,000 of which the British, including natives in Malaya and Ceylon, hold 58 percent and the Dutch 15 percent, while Americans trail with 3.7 percent. (x) Despite the growing importance of Dutch and native rubber, the British represented the largest share of capital in the industry throughout the period of restriction.

Rubber prices in 1920-22 were so low that the returns to the plantation companies were often below the all-in cost of production. The rise in rubber prices following enactment of restriction remedied this situation and profits rose steadily during 1923, 1924, and 1925. Dutch companies in the unrestricted areas were benefited relatively much more by the improved prices but for this reason the increase in their gains during 1925 was less than for the British companies. The Dutch companies were not able to increase their output to the same extent relatively and, furthermore, forward contracts for a large part of their output reduced the gain that might have accrued from the increase in prices. (y) This situation is indicated by the figures of the profits made by Dutch and British

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(x) "India Rubber World", November 1, 1927, p. 65
(y) "London Economist", May 21, 1927, p. 1070

rubber companies from 1920 to 1925.

Table XIII

Profits Made by Dutch and British Rubber Companies (z)

(percentages)

	Dutch (1)	British
1920	1.2 (2)	11.4
1921	9.1 (2)	1.0
1922	2.6	3.7
1923	9.3	6.8
1924	10.3	8.0
1925	21.6	23.8

(1) Figures represent 78 percent of the Dutch companies
(2) Deficit

Experience with forward contracts indicates that the general attitude of the shareholders is that they are all right only if you win. When prices rise company directors are blamed for the forward contracts they have made, while on a falling market they are blamed for not having sold more. A study made of forward sales by plantation companies during 1925 and 1926 shows that the rising prices of 1925 led to unusually heavy forward commitments while the falling prices in the next year caused them to be few.

One of the most common objections offered to the practice of forward selling is that it tends to depress the spot price of rubber at the time of delivery. The argument

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(z) "London Economist", May 21, 1927, p. 1070

is that manufacturers who have bought a large part of their requirements can depress day-to-day price by deliberately refraining from buying. It was on this ground that the Rubber Growers' Association declared its opposition to forward selling. On the other hand, this overlooks the fact that forward sales reduce supplies to the same extent that they reduce the amount demanded and it would seem that by enabling the producers of rubber to cover the most urgent of their necessary expenses through the return from their forward sales the more exigent sellers have been kept off the market. Therefore, little weight can be conceded to this objection.

Another objection advanced against forward selling is that it is gambling. Knowing how widely rubber prices have fluctuated in the past, however, it would seem that the directors who refuse, when the opportunity is offered, to sell at least a part of their output at a price which ensures them of a reasonable margin above cost of production are indulging in speculation rather than those who do not make such sales. A sounder policy and one quite widely followed, is to sell sufficient rubber ahead to cover cost of production and operation, leaving the balance for current marketing.

It was claimed that no company was able to pay divi-

dends out of profits made from the sale of rubber at or near the prevailing market price during 1920-22. Many companies were able to make greater profits during 1926 than during 1925 partly because of favorable forward contracts.

Companies which did not make forward contracts during 1925-26, and some contracts were closed to run as far as 1930, obtained returns considerably in excess of market quotations. A tabulation made in August 1926 of 430 British plantation companies having a combined total standard production of 149,328 long tons showed that 85,198 tons had been sold forward over a period of years at an average price of $.557 per pound. (aa) These same companies reported all-in costs of $.203 per pound.

A proposal for controlling prices through long-term contracts was considered during the rubber shortage of 1925. Failure to do so was extremely fortunate for the manufacturers since these contracts would have been based on prices prevailing at the time, the extent of the price reaction being anticipated by no one.

Experience with forward selling under restriction indicates the wisdom of maintaining such a policy. While certain companies failed to make extremely large gains

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(aa) "India Rubber and Tire Review", December 1926, p. 28

they might have during 1925-26 through forward commitments, still larger sums were lost by other growers because of failure to sell ahead during boom prices. The high prices realized at this time discouraged the making of forward contracts at reasonable prices by giving producers an exaggerated confidence in the ability of restrictive measures to maintain high prices. This is another instance in which the Stevenson Plan worked hardship by the uncertainty which it introduced into the market situation.

The gradual improvement in profits and dividends from the time of the passage of restriction up to the period of the rapid rise in rubber prices in 1925 was manifested. The price rise that occurred in 1925 resulted in greatly increased profits and dividends.

The movement of share values was less gradual than that of profits and dividends and had tended to follow commodity prices. Thus, a marked increase occurred just after the passage of restriction but with lower prices at the end of 1923 and during 1924 shares declined, in the case of the companies in restricted oountries, below the level prevailing before restriction. Shares reached their highest level early in December 1925, when the shares of many of the companies were at least double their price at the beginning of the year, while the shares of some were four times as high

as they had been at that time. From this peak there was a gradual decline. A slight improvement in share quotations occurred from time to time, as when prices revived and again when the American Pool was announced but the trend had been steadily downward.

Table XIV

Indexes of Prices of Crude Rubber & Rubber Company Shares (bb)

End of	Rubber	Shares of 52 Rubber Companies
January 1925	100	100
March	122	105
May	207	106
July	256	145
September	242	177
November	314	208
January 1926	193	196
February	148	180
March	166	199
April	135	185
May	118	182

Despite the fact that sterling companies in unrestricted areas voluntarily practiced restriction their shares rose relatively more than did those of companies in restricted countries. Similarly, they declined less during the slump

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(bb) "London Economist", June 12, 1926, p. 1135

years 1923-24. This result was expected, since freedom from compulsory restriction made it possible, at least, for these companies to earn larger dividends and would have been still greater but for voluntary restriction. It is also seen from the quotations for 1929 that the shares for companies in unrestricted areas lost much of their relative gain following removal of restriction.

The position of rubber companies improved with respect to reserves. During slump years profits were small or non-existent so that considerable sums were taken from reserves. With increase in rubber prices an increasing proportion of profits was devoted to reserves. For a time the rubber industry was devoting less of its profits to reserves than other industries were doing but as profits became greater this condition was remedied. The practice of paying large dividends in the rubber industry made it difficult to strengthen reserves at the expense of dividends. This failure to provide more fully to reserves was largely due to the desire of stockholders to realize large dividends by way of recouping for the lean years of 1920-22. Furthermore, general overconfidence in restriction and the belief in its permanence tended to make directors neglect conservative policies.

Organization of New Companies

The high prices of the boom period led to the formation of a number of new companies and an extension of operations in existing companies. Native planting was expanded to a still greater extent and planting in unrestricted areas exceeded that of restricted countries. In different ways therefore, the predominance of the B ritish rubber owning interests had been reduced. The lead of the British in rubber production seems to be seriously menaced and in view of the large amount of new planting, as well as the development of the reclaiming industry there is little probability that the price of rubber will be as high in the future as it has been. The period of general high profits for rubber plantations seems to be at an end. The general level of profits will be similar to that of other established industries. Although these changes might have occurred in any case they were hastened by restriction.

The investing country is more affected by high prices for rubber than is the producing country so far as the actual amount received is concerned. For where the capital invested is owned abroad the chief share going to the producing country consists in the payment for the costs of production and these do not vary materially whether the price be high or low, although the volume produced is of consid-

erable significance. The return to the investing country on the other hand, depends upon the excess above the cost of production and where profits have been low they may be multiplied many times by only a slight change in price. To the extent therefore, that the Stevenson Act contributed to an increase in the price of rubber, the investing country increased its share relatively more than the producing country. (cc)

(cc) Whittlesey, Charles R., "Governmental Control of Crude Rubber", 1931, pp. 172-173

PART FIVE

Collapse of the British Scheme

In 1925 a combination of forces was set in motion which was to undermine this restrictive plan. A tremendous demand came into the market for raw rubber in that year, induced principally by an unprecedented expansion of the motor-car industry in this country, and further stimulated by the introduction of ballon tires. Prices for rubber quickly swept beyond the so-called "fair price" of 1s. 3d. on which the Stevenson Act was originally based; and partly as a result of increased demand, partly as a result of the artificial restrictions of this Act, continued to climb until they had reached around $1.20 a pound. Even at this level, 100 percent export was not permitted by British Authorities.

It was this maintenance of the regulation of supply, at a time when prices had long since exceeded the level necessary to pay fair returns to producers, that sounded the death-knell of the measure. While the costs of production of British planters were being increased through the policy of curtailment and the expenses of enforcing the provisions of the law, new stimulus was being imparted to rubber production elsewhere. The Dutch East Indies now, able to produce at lower cost than the British because they were unrestricted by hampering legislation increased

their output rapidly; American manufacturers built up a reserve pool. Three of them, the largest buyers of crude rubber in the world, went into the planting business. Development of rubber growing began in Africa and activity was increased in South America, and substitutes in the form of reclaimed rubber, improved methods of manufacturing tires bringing about increased longevity of the average tire and rubber obtained from guayule and other plants began to sprout like mushrooms. Another American opposition to the curtailment policy was the organization of the New York Rubber Exchange which provided an orderly market for trading.

The following table shows the dynamic nature of demand of the tire industry:

Table XV

U.S. Production of Automobile Casings by Types 1910-1929 (a)

	Fabric	High Process Cord	Balloon	6 to 8 Ply	Total
1910	100				100
1920	65	35			100
1925	14.1	51.8	34.1		100
1926	5.3	47.2	42.5	5.0	100
1929		25.1	58.0	16.9	100

(a) Fraser, C.E., and Doriot, G.F., Op. Cit., p. 103

Table XVI

U.S. Crude and Reclaimed Rubber Consumption (b)
(ooo's of long tons)

	Crude	Reclaimed	Ratio of Reclaimed
1925	388	137	35.3
1926	366	164	40
1927	373	189	50.8
1928	437	223	51.0
1929	467	217	45.5
1930	376	153	40.7

In 1928 the plan which obviously lacked flexibility and was being obstinately retained was abandoned at the demand of the planters in Malaya and Ceylon for whose benefit it was adopted. Instead of making them rich it kept them poor. Instead of bringing stabilized prosperity it cost them their former dominance of the world rubber market where five years previous British produced 75 percent of the world's rubber, in 1928 she produced 50 percent.

(b) Zimmerman, Erich W., "World Resources and Industries", 1933, p. 393

Table XVII

Average Price of Rubber & U.S. Share of World Production (d)

	Plantation, Ribbed, Smoked Sheet (per lb. N.Y.)	United States Share of World Production (percentages)
1910	2.066	45
1911	1.413	44.6
1912	1.216	49
1913	.820	43.3
1914	.653	50.6
1915	.657	58
1916	.725	54.9
1917	.722	64.4
1918	.602	65.3
1919	.485	59.6
1920	.359	73
1921	.165	59.6
1922	.173	72.9
1923	.307	73.8
1924	.264	74.9
1925	.730	73
1926	.487	64.1
1927	.381	65.6
1928	.226	61.5
1929	.206	61.2
1930	.119	55.9
1931	.062	59.1
1932	.035	55.7
1933(6 mos.)	.0396	

(d) "Statistical Abstract" of United States, 1933 p. 290

PART SIX

Conclusions and Future

Brazil has tried to regulate the price of coffee and rubber; the state of Yucatan has endeavored to control the price of sisal hemp; and now Great Britain attempted to regulate and stimulate the price of rubber. All attempts have not met with unqualified success.

Certain fundamental economic laws are working with respect to the marketing of these staple commodities. The efforts and legislation of man seem to have little success in molding or changing the main currents of international trade. When Brazil endeavored to raise the world price of coffee by placing a large part of her crop in storage, which was to be thrown on the market at a later unnamed date, she attempted that which is directly in opposition to definite economic laws. In the face of powerful economic forces, which have turned rich producing areas into morasses of poverty and financial despondency, and have caused other areas commercially and agriculturally dead for centuries to flourish like the proverbial bay tree, such attemps to control these forces seem puerile.

The British attempt to control the crude rubber situation had been of an essentially different character. Instead of striking at the results of overproduction, and with characteristic willingness to face consequences, the

British undertook to reduce production and to prevent the recurrence of overproduction. The weak link in that chain of cause and effect was that there were large areas of rubber-producing country and prospective rubber-producing country not under British control and hence, not subject to the measures that have been taken. The British effort appeared to be an honest attempt to work with economic forces rather than against them, and its effects were for a period salutary and prices for a few years passed the cost of production.

Reasons for Lack of Success in Controlling Prices of Staple Commodities (a)

The lack of success experienced by nations and groups of producers in controlling and regulating prices seemed to be due to certain general facts or principles:

1. Usually such attempts have been made in the interest of a small producing area, in the belief that it held control over a certain commodity. Consequently overconfidence has prompted attempts to extort unusually high profits.

(a) Pratt, E.E., "International Trade in Staple Commodities", 1928, p. 7

2. Generally, such attempts have had as an essential part of the plan, the concealment of the quantity of production or the stocks of the commodity on hand. Under modern conditions this is almost impossible.

3. Such schemes have usually been based on erroneous conceptions of the world market for the commodity in question. Producers usually exaggerate and grossly so the size and urgency of the market for the commodity in which they are interested. Their estimates of the market's ability to take are usually far in excess of the facts.

4. Stocks of merchandise piling up in warehouses, in the producing areas or at seaboard, have proved more and more impossible to finance. Dealers everywhere recognize such stocks are virtually on the market and merely await their release. Such stocks inevitably depress market prices.

5. Agricultural crops are notoriously speculative. With striking frequency,

> bumper crops have been harvested at the very moment when the greatest curtailment of production is the most obvious requisite to the success of a scheme of control or monopoly.

Probable conditions of success can only come about in one of two general ways: First, by intelligently controlling, regulating, and probably limiting production, either current or prospective; or second, by enlarging, broadening, or deepening the market, and by improving, grading, and popularizing the product and its derivatives.

The Increasing Importance of World Price Levels

With the improvement and cheapening of communication, especially the telegraph, telephone, cable, and wireless, such a thing as a local price for a staple commodity has almost ceased to exist in any true sense of the term. Just as the markets for staple commodities have become world wide, so have the prices of these staples become world wide. Prices have ceased to be made locally, or as the result of local conditions. Except for tariff barriers, which are of comparatively little importance in the case of staple raw

commodities, there is comparative freedom of trade between all producing areas on the one hand and all consuming areas on the other. The development of rubber plantations in the Far East wellnigh ruined the rubber-producing sections of Brazil. But less far-reaching changes take place from season to season. A disastrous wheat crop in Argentina may stimulate prices all over the rest of the world; while during the next season a bumper crop in Canada may so depress prices as to cause hardship in the producing areas of India and the Argentine. The prices of staple commodities today are world prices. They are regulated by conditions of production and consumption in all of the producing areas of the world. That area lagging behind in methods, in efficiency, or in quantity, even by reason of conditions over which it has no control, must suffer the consequences.

Increasing Safety in the Conduct of International Trade in Staple Commodities

The increasing safety with which the international business in staple commodities is conducted is readily apparent. There was a time when sea-going merchants carried the burden of two risks, both entirely beyond their control. One was the perils of the sea and the other was the danger of an unstable market. The first of these risks commodities, there is comparative freedom of trade between all producing areas on the one hand and all consuming areas on the other.' The development of rubber plantations in the Far East wellnigh ruined the rubber-producing sections of Brazil. But less far-reaching changes take place from season to season. A disastrous wheat crop in Argentina may stimulate prices all over the rest of the world; while during the next season a bumper crop in Canada may so depress prices as to cause hardship in the producing areas of India and the Argentine. The prices of staple commodities today are world prices. They are regulated by conditions of production and consumption in all of the producing areas of the world. That area lagging behind in methods, in efficiency, or in quantity, even by reason of conditions over which it has no control, must suffer the consequences.

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> 1. It has enabled merchants to avoid the danger and loss of shipping commodities to markets where prices have fallen, and has therefore reduced the cost of doing business.
>
> 2. It has made large-scale operations in such commodities possible, again reducing costs.
>
> 3. It has made it possible for banks to finance such transactions at a minimum of risk and at low rates, still further reducing costs of doing business.
>
> 4. It has made possible the useful employment of the speculator, who takes the risks

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(b) Pratt, E.E., "International Trade in Staple Commodities", 1928, p. 9

and permits the real merchant to trade safely.

5. It has tended by anticipating market conditions to smooth out the violent price fluctuations which were at one time the menace of the trade in practically every staple.

If it were not for the facilities afforded by future trading, international trade in staple commodities would not be possible on the present scale or at the present low cost.

Criticism of the Stevenson Act (c)

This criticism is divided into two parts, the first relating to its effect upon the rubber market and the second to its effect on the industry which it was designed to assist.

The major weakness of the scheme from the standpoint of its effect on price lay in its inelasticity. This defect, which became most apparent during the period of runaway prices of 1925-26, arose out of the provision that the exportable quota could be increased by not more than 10 per-

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(c) "Journal of Political Economy", August 1931, pp. 520-25 Charles R. Whittlesey.

cent of standard production and only at quarterly intervals. While this provision was somewhat improved by later modifications, supply remained to the end, insufficiently responsive to changes in price. Moreover, the Act is to be criticized for having introduced great uncertainty into the market. The panic in 1925 would probably have been avoided if it had been made clear at the outset that the automatic operation of the scheme would not be interfered with. The failure of planters to make forward sales at high prices was due to their overconfidence in the ability of the plan to bring about high prices, and for the same reason many of them failed to set aside adequate reserves. There was also a feeling of uncertainty arising from the existence of a considerable volume of export coupons which might or might not be thrown on the market, and also an uncertainty arising at the end of the quarter when the average price happened to be near a pivotal level, of the possibility of changes being made in the provisions of the act, and of the uncertainty as to the continuance of restriction.

From the standpoint of the industry the fundamental criticizm of restriction lies in the fact that it stimulated heavy planting both in restricted and unrestricted areas. While restriction may have aided in bringing temporary relief through higher prices, in so far as it led to increased

planting it helped to exaggerate a condition of potential overproduction, thus rendering worse the very situation it was designed to relieve. Furthermore, many native producers of rubber were led to abandon the production of crops other than rubber to which they had been able to turn at times of depression in the rubber industry. These growers were less able to face a period of unrestrained competition in the industry at the end of restriction than they had been in 1922.

The Latest Rubber Scheme of World Producers (d)

However bitter the experience with the Stevenson Restriction it is not deterring the setting up of another control plan. British, Dutch, and French producers, responsible for more than 98 percent of the world's output of crude rubber had agreed in May 1934 to a five year plan to control rubber exports in order to regulate and raise prices.

This new plan does not attempt to fix prices. It prohibits further planting in present areas and limits replanting of present plantations to 20 percent; it sets a fixed maximum quota which each signatory can export in

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(d) "Business Week", May 5, 1934, pp. 22-23

each of the five years; it provides for an increase in total exports of 25 percent over the five years from the present 1,019,000 tons. Signatories include Malaya, Netherlands, India, Burma, French Indo-China, North Borneo, Sarawak, and Siam. The plan was supposed to become effective as soon as the various governments could pass the required legislation. Britain expected it to become operative in the colonies in the following month.

London at the time had been anticipating the announcement. Rubber shares boomed and caused heavy purchases of rubber futures. The boom became so great that worried authorities recalled the failure of the previous scheme.

New York received news of the plan calmly, though not without misgivings. Stocks on hand were sufficient to meet demand for the next ten months. However, large users are wary of any scheme which restricts the export of a raw material whose source is almost entirely under foreign control. Therefore, since producers are not likely to force another threat on the consumer we can safely predict that this plan will go the way of previous restriction schemes.

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11:55	Wm J. Barry (Art)
9:45	David J. Barrows (3)
7:20	Agnes Blyth

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